राजीवगांधीविश्वविद्यालय
RAJIV GANDHI UNIVERSITY
रोनोहिल्स, दोइमुख
RONO HILLS, DOIMUKH

फ़ाइलसंख्याFile No.AC-244/Geography/99(Vol-I) **दिनांक**Dated the 2nd Sept., 2025

To,

Prof. G. Nimasow,Head,
Department of Geography,
Rajiv Gandhi University,
Rono Hills, Doimukh.

Sub:- **Approval of of Minutes of Meeting of Board of Studies(Internal) in regards to Partial Modification of UG/PG Syllabus.**

Ref: Letter No.RGU/GEOG/2025, dated 25th August,2025

Sir,

With reference to the letter no. cited above, I am directed to inform you that the minutes of the meeting of Board of Studides(intenal) in relation to partial modification of UG/PG Syllabus under the Department of Geography has been approved by the competent Authority subject to ratification in the next Academic Council.

This is for your kind information.

Yours faithfully,

03/9/2025
Section Officer (Academic)
अनुभाग अधिकारी (शैक्षिक)

ज्ञापनसंख्याMemo No.AC-244/Geography/99(Vol-I)/565 **दिनांक** Dated:-03..Sept,2025
Copy to:-

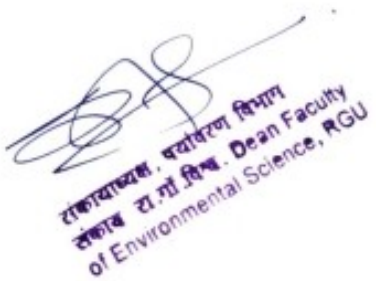
1. P.S to Vice-Chancellor for in formation please.
2. P.S. to Registrar for information please.
3. Office copy.

03/9/2025
Section Officer (Academic)
अनुभाग अधिकारी (शैक्षिक)

RAJIV GANDHI UNIVERSITY
RONO HILLS
ARUNACHAL PRADESH

Four Year (B.A) Undergraduate Programme (FYUP) with Honours in Geography

W.E.F 2024-25



(Annexure 2)

Course Structure for Four Year Undergraduate Programme (FYUP) with Honours and Research in Geography

NCrF Credit Level	Semester	Course Type	Course Code	Course Name	Credit
4.5	B.A I	Major Course (Core)	GEO-CC-1110	Physical Geography	4
		Minor course	GEO-MC-1110	Physical Geography	4
		Multidisciplinary course	GEO-MD-1110	Disaster Management	3
		Ability Enhancement Course	ENG-AE-1110		4
		Skill Enhancement Course	GEO-SE-1110	Fundamentals of Cartography	3
		Value Added Course	EVS-VA-1110		2
	B.A II	Major Course (Core)	GEO-CC-1210	Human Geography	4
		Minor course	GEO-MC-1210	Human Geography	4
		Multidisciplinary course	GEO-MD-1210	Geography of Tourism	3
		Ability Enhancement Course	ENG-AE-1210		4
		Skill Enhancement Course	GEO-SE-1210	Remote Sensing	3
		Value Added Course	EVS-VA-1210		2
Students exiting the programme after securing 40 credits will be awarded UG Certificate in the relevant Discipline provided they secure 4 credits in work-based vocational courses offered during the summer term or internship/Apprenticeship in addition to 6 credits from skill-based courses earned during the first and second semester					
5.0	B.A III	Major Course (Core)	GEO-CC-2310	Geography of India	4
			GEO-CC-2320	Geomorphology	4
		Minor course	GEO-MC-2310	Geography of India	4
		Multidisciplinary course	GEO-MD-2310	Traditional Ecological Management	3
		Skill Enhancement Course	GEO-SE-2310	Geographical Information System	3
		Value Added Course	GEO-VA-2310		2
	B.A IV	Major Course (Core)	GEO-CC-2410	Political Geography	4
			GEO-CC-2420	Geographical Analysis (Practical 1)	4
			GEO-CC-2430	Regional Planning	4
			GEO-CC-2440	Field Study	4
		Minor course	GEO-MC-2410	Population Geography	4
Students exiting the programme after securing 80 credits will be awarded UG Diploma in the relevant Discipline provided they secure additional 4 credits in skill-based vocational courses offered during the first year or second year summer term.					
5.5	B.A V	Major Course (Core)	GEO-CC-3510	Climatology	4
			GEO-CC-3520	Agricultural Geography	4
			GEO-CC-3530	Human Geography-2	4
			GEO-CC-3540	Geographical Analysis (Practical 2)	2
		Internship	GEO-IN-3510	Internship	2
		Minor Course	GEO-MC-3510	Economic Geography	4
	B.A VI	Major Course (Core)	GEO-CC-3610	Remote Sensing and GIS	4
			GEO-CC-3620	Geographic Thought	4
			GEO-CC-3630	Settlement Geography	4

			GEO-CC-3640	Geographical Analysis (Practical 3)	4
		Minor Course	GEO-MC-3610	Remote Sensing and GIS	4
Students who want to undertake 3-year UG programme will be awarded UG Degree (B.A) in Geography upon securing 124 credits.					
6.0	B.A VII	Major Course (Core)	GEO-CC-4710	Research Trends in Physical Geography	4
			GEO-CC-4720	Research Trends in Biogeography	4
			GEO-CC-4730	Research Trends in Human Geography	4
			GEO-CC-4740	Research Trends in Regional Planning	4
		Minor Course	GEO-MC-4710	Research Methodology	4
	B.A VIII	Major Course (Core)	GEO-CC-4810	Geographical Field Work 2	4
		Major Course (Research)	GEO-CC-4820	UG Research Project	12
		Minor Course	GEO-MC-4810	Research and Publication Ethics	4
				TOTAL CREDIT	**160**

Dean Faculty of Environmental Science, RGU

SEMESTER 1

SEMESTER I

GEO-CC-1110: PHYSICAL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination=80 and Internal Examination -20)

CourseObjectives:

1. Understanding the basic concepts and different dimensions of Physical Geography.
2. General overview on geomorphology, climatology and oceanography

Learning Outcome:

After the completion of course, the students will have ability to:

1. Gain a perspective on various concepts of physical geography
2. Have comprehensive knowledge on applicability and usage.

UNIT	COURSE CONTENT
UNIT 1	Nature and Scope of Physical Geography: Basic concepts, Interrelationship with other branches of Earth Sciences, Historical Development of physical geography
UNIT 2	Geomorphic form and Processes: agents of denudation and weathering, mass movement/wasting, fluvial, wind, glacial and karst
UNIT 3	Elements of weather and climate: composition and structure of atmosphere, Atmospheric pressure and winds, Insolation and heat budget, Air masses and fronts (Cyclones and anticyclones)
UNIT 4	Oceanography: Waves, tides and ocean currents, Temperature and Salinity, Ocean Relief (Continental shelf, slope, deeps and trenches, abyssal plain)

Suggested readings:

1. Christopherson, R. W. and Birkeland, G. H., (2012) *Geosystems: An Introduction toPhysical Geography* (8thedition), Pearson Education, New Jersey.
2. Das Gupta, A and Kapoor, A.N., (2001) *Principles of Physical Geography,* S.C. Chand & Co1mpany Ltd. New Delhi.
3. Khullar, D.R., (2012) *Physical Geography*, Kalyani Publishers, New Delhi.
4. Critchfield, H. J., (1987): *General Climatology*, Prentice-Hall of India, New Delhi
5. Oliver, J. E., and Hidore J. J., (2002): *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
6. Pinet, P. R., (2008): *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
7. Lal, D. S., (2006): *Jalvayu Vigyan (Hindi),*, PrayagPustakBhavan, Allahabad
8. Singh, S., (2009): *Jalvayu Vigyan (Hindi),*, Prayag Pustak Bhawan, Allahabad

GEO-MC-1110: PHYSICAL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. Understanding the basic concepts and different dimensions of Physical Geography.
2. General overview on geomorphology, climatology and oceanography

Learning Outcome:
After the completion of course, the students will have ability to:

1. Gain a perspective on various concepts of physical geography
2. Have comprehensive knowledge on applicability and usage.

UNIT	COURSE CONTENT
UNIT 1	Nature and Scope of Physical Geography: Basic concepts, Interrelationship with other branches of Earth Sciences, Historical Development of physical geography
UNIT 2	Geomorphic form and Processes: agents of denudation and weathering, mass movement/wasting, fluvial, wind, glacial and karst
UNIT 3	Elements of weather and climate: composition and structure of atmosphere, Atmospheric pressure and winds, Insolation and heat budget, Air masses and fronts (Cyclones and anticyclones)
UNIT 4	Oceanography: Waves, tides and ocean currents, Temperature and Salinity, Ocean Relief (Continental shelf, slope, deeps and trenches, abyssal plain)

Suggested readings:

1. Christopherson, R. W. and Birkeland, G. H., (2012) *Geosystems: An Introduction to Physical Geography* (8thedition), Pearson Education, New Jersey.
2. Das Gupta, A and Kapoor, A.N., (2001) *Principles of Physical Geography,* S.C. Chand & Co1mpany Ltd. New Delhi.
3. Khullar, D.R., (2012) *Physical Geography*, Kalyani Publishers, New Delhi.
4. Critchfield, H. J., (1987): *General Climatology*, Prentice-Hall of India, New Delhi
5. Oliver, J. E., and Hidore J. J., (2002): *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
6. Pinet, P. R., (2008): *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
7. Lal, D. S., (2006): *Jalvayu Vigyan (Hindi),*, PrayagPustakBhavan, Allahabad
8. Singh, S., (2009): *Jalvayu Vigyan (Hindi),*, Prayag Pustak Bhawan, Allahabad

GEO-MD-1110:DISASTER MANAGEMENT

Credit 3- (Credit Hours in a week: Lecture-3)

Marks: 75 (End Term Examination = 60 and Internal Examination = 15)

CourseObjectives:

1. Understanding the basic concepts of disaster management.
2. Detailed analysis about the different types of disasters in India.
3. Evaluating the role of institutional frameworks to mitigate the disasters in the country.

Learning Outcome:

After the completion of course, the students will have ability to:

1. Gain a perspective of disasters and various dimensions of disaster management
2. Have comprehensive knowledge of various natural and manmade disasters in India
3. Examine the response and mitigation measures of disasters

UNIT	COURSE CONTENT
UNIT 1	Disasters: Definition and Concepts; Risk and Vulnerability; Classification
UNIT 2	Disasters in India: (a) Flood: Causes, Impact, Distribution and Mapping; Landslide: Causes, Impact, Distribution and Mapping; Drought: Causes, Impact, Distribution and Mapping, Disasters in India: (b) Earthquake and Tsunami: Causes, Impact, Distribution and Mapping, (c) Cyclone: Causes, Impact, Distribution and Mapping.
UNIT 3	Manmade disasters: Causes, Impact, Distribution and Mapping, Response and Mitigation to Disasters: Mitigation and Preparedness, NDMA and NIDM, Indigenous Knowledge and Community-Based Disaster Management; Do's and Don'ts (During and Post-disasters)

Suggestive Readings:

1. Government of India, (2008): *Vulnerability Atlas of India*. New Delhi, Building Materials & Technology Promotion Council, Ministry of Urban Development, Government of India.
2. Govt. of India, (2011): *Disaster Management in India*, Ministry of Home Affairs, New Delhi.
3. Kapur, Anu., (2010): *Vulnerable India: A Geographical Study of Disasters*, Sage Publication, New Delhi.
4. Modh, S., (2010): Manag*ing Natural Disaster: Hydrological, Marine andGeological Disasters*, Macmillan, Delhi.

5. Singh, Jagbir., (2007): "Disaster Management Future Challenges and Opportunities", 2007.

6. Singh, R. B., (ed.), (2006): Natural Hazards and Disaster Management: Vulnerability and Mitigation, Rawat Publications, New Delhi.
7. Singh, R.B., (2005):*Risk Assessment and Vulnerability Analysis*, IGNOU, New Delhi. Chapter 1, 2 and 3
8. Sinha, A., (2001): *Disaster Management: Lessons Drawn and Strategies for Future*, New United Press, New Delhi.

GEO-SE-1110: FUNDAMENTALS OF CARTOGRAPHY
(Practical)

Credit 3- (Credit Hours in a week: Lecture-3)
Marks: 75 (End Term Examination = 60 and Internal Examination = 15)

Course Objectives:

1. Create professional and aesthetically pleasing maps through thoughtful application of cartographic conventions;
2. Develop an understanding of the concepts regarding scale, map projections to suit map purposes;
3. Better understand the techniques of interpretation of topographical and weather maps.

Learning Outcome:
After the completion of course, the students will have ability to:

1. Read and prepare maps.
2. Comprehend locational and spatial aspects of the earth surface.
3. Use and importance of maps for regional development and decision making.

UNIT	COURSE CONTENT
UNIT 1	Cartography – Nature, Scope and development, Concept and types of Scales, map and surveying
UNIT 2	Graphical Construction of Plain, Comparative and Diagonal Scales, Topographical maps: Interpretation of topographical and Weather maps
UNIT 3	Surveying: Plane table, prismatic compass and dumpy level

Suggestive Readings:

1. Anson, R., and Ormelling F. J., (1994): *International Cartographic Association: Basic Cartographic, Vol.*Pregmen Press.
2. Singh, Gopal., (1998): *Map Work and Practical Geography (4th Edition)*, Vikas Publishing House, Ahmedabad.
3. Gupta, K.K. and Tyagi V.C.,(1992): *Working with Map*, Survey of India, DST, New Delhi.
4. Kraak, M.J., (2010):*Cartography: Visualization of Geospatial Data* (3rd edition), Pearson Education Ltd., London.
5. Misra, R.P., (2014): *Fundamentals of Cartography* (Second Revised and Enlarged Edition), Concept Publishing, New Delhi.

6. Monkhouse, F. J. and Wilkinson, H. R.,(1973): *Maps and Diagrams*, Methuen, London.
7. Rhind, D. W. and Taylor D. R. F., (eds.) (1989): *Cartography: Past, Present andFuture*, Elsevier, International Cartographic Association.
8. Robinson, A. H.,(2009): *Elements of Cartography* (6th Edition), John Wiley and Sons, New York.
9. Sarkar, A.,(2015):*Practical geography: A systematic approach*, Orient Black Swan Private Ltd., New Delhi
10. Sharma, J. P., (2010): *PrayogicBhugol(Hindi)*, Rastogi Publishers, Meerut.
11. Singh, R.L. and Singh R.P.B.,(1999): *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
12. Singh, R.L. &Dutta, P.K., (2012):*PrayogatmakBhugol(Hindi)*, Central Book Depot, Allahabad
13. Singh,R.L.,& Singh, Rana. P.B.,(1991):*PrayogtmakBhugolkeMoolTatva(Hindi)*, Kalyani Publishers, New Delhi
14. Steers, J.A. (1970):*An Introduction to the Study of Map Projections*, University of London Press, London.
15. Khan, Zulfequar Ahmad., (1998):*Text book of Practical Geography*, Concept Publishing Company, New Delhi.

SEMESTER II

SEMESTER II

GEO-CC-1210: HUMAN GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. Understand the basics concepts of human geography in context of population attributes economic, cultural, and trade activities and
2. To understand the impact of population attributes on the development of a region.

Course Outcome:

After the completion of course, the students will have ability to:

1. Students will learn how human, physical, and environmental components of the world interact with economic processes such as globalization, trade and
2. Gain insight of the social, economic and cultural aspects of region

UNIT	COURSE CONTENT
UNIT 1	Introduction to Human Geography: Definition, nature, scope and Approaches to the study of human geography, Concepts in Human Geography (Place, Space and Landscape), Understanding of man nature relationship: Determinism, Possibilism and Neo determinism, Fields and sub fields in Human geography
UNIT 2	Population and Settlement: Growth of population, distribution, density of the world; Migration: causes, types and consequences, Theory and Model of population growth: Malthus and Demographic Transition, Origin, function, and classification of rural and urban settlement Types
UNIT 3	Socio-Economic and political dimension: Languages, religion and races-definition and world distribution; Habitat and economy of selected communities (Eskimo, Bushmen), Economic Activities: Concept and classification-primary, secondary and tertiary, Concept of Nation and State; Frontiers and Boundaries-Definition and Types
UNIT 4	Geography and Development: Concept of development and Sustainable Development, Indicators and measures of development (economic, social and environmental), Global pattern of development

Suggestive Readings:

1. Husain, Majid (2021): Human Geography, Rawat Publications, New Delhi.
2. Maurya, S.D. (2018): Human Geography, Pravalika Publications, Allahabad.
3. Maurya, S.D. (2016): Cultural Geography, Sardha Pustak Bhawan, Allahabad.
4. Patra, Punyatoya et al (2020): Perspectives in Human Geography, Concept Publishing Company, Ltd., New Delhi.
5. Rubenstein, James M. (2012): Contemporary Human Geography, Prentice Hall of India, New Delhi.
6. Saxena, H.M. (2018): Economic Geography, 2 nd Edition, Rawat Publications, New Delhi.
7. Singh, Dr. L.R. (2018): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad

GEO-MC-1210: HUMAN GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. Understand the basics concepts of human geography in context of population attributes economic, cultural, and trade activities and
2. To understand the impact of population attributes on the development of a region.

Course Outcome:
After the completion of course, the students will have ability to:

1. Students will learn how human, physical, and environmental components of the world interact with economic processes such as globalization, trade and
2. Gain insight of the social, economic and cultural aspects of region

UNIT	COURSE CONTENT
UNIT 1	Introduction to Human Geography: Definition, nature, scope and Approaches to the study of human geography, Concepts in Human Geography (Place, Space and Landscape), Understanding of man nature relationship: Determinism, Possibilism and Neo determinism, Fields and sub fields in Human geography
UNIT 2	Population and Settlement: Growth of population, distribution, density of the world; Migration: causes, types and consequences, Theory and Model of population growth: Malthus and Demographic Transition, Origin, function, and classification of rural and urban settlement Types
UNIT 3	Socio-Economic and political dimension: Languages, religion and races-definition and world distribution; Habitat and economy of selected communities (Eskimo, Bushmen), Economic Activities: Concept and classification-primary, secondary and tertiary, Concept of Nation and State; Frontiers and Boundaries-Definition and Types
UNIT 4	Geography and Development: Concept of development and Sustainable Development, Indicators and measures of development (economic, social and environmental), Global pattern of development

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Suggestive Readings:

1. Husain, Majid (2021): Human Geography, Rawat Publications, New Delhi.
2. Maurya, S.D. (2018): Human Geography, Pravalika Publications, Allahabad.
3. Maurya, S.D. (2016): Cultural Geography, Sardha Pustak Bhawan, Allahabad.
4. Patra, Punyatoya et al (2020): Perspectives in Human Geography, Concept Publishing Company, Ltd., New Delhi.
5. Rubenstein, James M. (2012): Contemporary Human Geography, Prentice Hall of India, New Delhi.
6. Saxena, H.M. (2018): Economic Geography, 2 nd Edition, Rawat Publications, New Delhi.
7. Singh, Dr. L.R. (2018): Fundamentals of Human Geography, Sharda Pustak Bhawan, Allahabad

GEO-MD-1210: GEOGRAPHY OF TOURISM

Credit 3- (Credit Hours in a week: Lecture-3)
Marks: 75 (End Term Examination =60 and Internal Examination=15)

CourseObjective:

1. To understand the various dimensions of geography of tourism
2. To make aware the students about national and international trends and patterns of tourism and itsimpact.

Learning Outcome:
After the completion of course, the students will have ability to:

1. Equip with a basic understanding of nature and scope, trends and patterns of various types of tourisms.
2. Have sound knowledge on geographical, environmental and socio-cultural aspects of tourism in India.

UNIT	COURSE CONTENT
UNIT 1	Scope and Nature: Concepts and Issues, Tourism, Recreation and Leisure Inter-Relations; Geographical Parameters of Tourism by Robinson
UNIT 2	Trends and Patterns: Nature Tourism, Cultural Tourism, Medical Tourism, Eco-tourism, Geo-Tourism
UNIT 3	Impact of Tourism: Economy; Environment; Society Tourism in India: Tourism Infrastructure; Case Studies of Himalaya, Desert and Coastal Areas; India's World Heritage Sites and National Geological Monuments, National Tourism Policy

Suggestive Readings:

1. Alan, A. Lew, (2017): *New Research Paradigms in Tourism Geography*, Routledge,.
2. Dhar, P.N., (2006): *International Tourism: Emerging Challenges and FutureProspects,*Kanishka, New Delhi.
3. Hall, M., and Stephen, P., (2006): *Geography of Tourism and Recreation–Environment,Place and Space*, Routledge, London.
4. Kamra, K. K., and Chand, M., (2007): *Basics of Tourism: Theory, Operation andPractise*, Kanishka Publishers, Pune.
5. Milton, D.,(1993): *Geography of World Tourism,* Prentice. Hall, New York.

6. Nelson, V., (2017): *An Introduction to the Geography of Tourism*, Rowman & Littlefield,
7. Page, S. J., (2011): *Tourism Management: An Introduction*, Butterworth-Heinemann-USA.
8. Raj, R. and Nigel, D., (2007): *Morpeth Religious Tourism and Pilgrimage Festivals*
9. *Management: An International perspective by CABI*, Cambridge, USA.
10. Robinson, H. A.,(1996): *Geography of Tourism,* Macdonald and Evans, London,.
11. Singh, Jagbir., (2014): "*Eco-Tourism*", I.K. International Pvt. Ltd. New Delhi, India.
12. Tourism Recreation and Research Journal, Centre for Tourism Research and Development, Lucknow.
13. Widawski, K., and Wyrzykowski, J.,(2017): The Geography of Tourism of Central and Eastern European Countries, Springer.

GEO-SE-1210: REMOTE SENSING

Credit 3- (Credit Hours in a week: Theory - 1, Practical - 2)
Marks: 75 (End Term Examination = 60 and Internal Examination = 15)

CourseObjectives:

1. This courses hall introduces the basic concepts of remote sensing.
2. This paper shall elucidate about aerial photography, its basic principles and types, satellite Rsensing.
3. This course shall provide detailed understanding related to interpretation and application of remote sensing.

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Appreciate the strength and application of remote sensing
2. Map the resources, their location and availability

UNIT	COURSE CONTENT
UNIT 1	Definition, concept, development, EMR Interaction with Atmosphere and Earth Surface, Aerial Photography and Satellite Remote Sensing,
UNIT 2	Base map (Survey of India Toposheet), Visual Interpretation using Aerial Photograph: Land use/Landcover, identification of hydrological features
UNIT 3	Visual Interpretation using Satellite Data: Forest monitoring, Water resources and Urban Sprawl analysis (Change detection)

Suggestive Readings:

1. Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad
2. Campbell, J. B., (2007): *Introduction to Remote Sensing*, Guildford Press.
3. Chauniyal, D.D., (2010): *SudurSamvedanevam Bhogolik Suchana Pranali (Hindi)*, Sharda Pustak Bhawan, Allahabad.
4. Jensen, J. R., (2004): *Introductory Digital Image Processing: A Remote SensingPerspective*, Prentice Hall Inc., New Jersey.
5. Jensen, J.R. (2007):*Remote Sensing of the Environment: An Earth ResourcePerspective*, Prentice-Hall Inc., New Jersey.
6. Joseph, G. (2005): *Fundamentals of Remote Sensing*, United Press India.
7. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): *Spatial InformationTechnology for Sustainable Development Goals*, Springer.

8. Lillisand, T.M., and Kiefer, P.W., (2007): *Remote Sensing and ImageInterpretation*,6thEdition, John Wiley & Sons, New York.
9. Nag, P. and Kudra, M., (1998): *Digital Remote Sensing*, Concept, New Delhi.
10. Rees, W. G., (2001): *Physical Principles of Remote Sensing*, Cambridge University Press.
11. Sarkar, A. (2015): *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
12. Singh, R. B. and Murai, S., (1998): *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

SEMESTER III

SEMESTER III

GEO-CC-2310: GEOGRAPHY OF INDIA

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. Understanding the physical profile of the country.
2. To study the resource endowment, its spatial distribution

Learning Outcome:

After the completion of course, the students will have ability to:

1. Understand the physical and social dimensions of the country.
2. To utilize resources for sustainable development.

UNIT	COURSE CONTENT
UNIT 1	Physical: Physiographic divisions, climatic characteristics, drainage system, soil and natural vegetation
UNIT 2	Demography: Growth and distribution, population composition (age sex, race, caste, religion, language and tribes)
UNIT 3	Economy: Agricultural regions, area and production of rice, wheat, cotton, Mineral and power resources (Iron ore, coal and petroleum), Major industrial regions, Trade and Commerce
UNIT 4	Environmental hazards: Flood, Drought, Landslide and soil erosion, Cyclone, earthquake, deforestation.

Suggestive Readings:

1. Deshpande, C. D., (1992): *India: A Regional Interpretation*, ICSSR, New Delhi.
2. Douglas, L. Johnson., (2009): World Regional Geography, Tenth edition, Pearson Education Inc, New Jersey.
3. Johnson, B. L. C., ed. (2001): *Geographical Dictionary of India*. Vision Books, New Delhi.
4. Khullar, D.R. (2014): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi.
5. Majid Husain (2009): *Geography of India*, Tata McGraw hill Education Private Ltd, New Delhi.
6. Mandal, R. B. (ed.), (1990): *Patterns of Regional Geography–An InternationalPerspective. Vol. 3–Indian Perspective*.

7. Pathak, C. R. (2003): *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.
8. Sdyasuk, Galina and P, Sengupta., (1967): *Economic Regionalisation of India*, Census of India.
9. Sharma, T.C. (2013): *Economic Geography of India*. Rawat Publication, Jaipur.
10. Singh R. L., (1971): *India: A Regional Geography*, National Geographical Society of India.
11. Singh, Jagdish.,(2003): *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R. B. and Prokop, Pawel.,(2016): *Environmental Geography of South Asia,* Springer, Japan.
13. Spate O. H. K. and Learmonth A. T. A., (1967): *India and Pakistan: A General andRegional Geography*, Methuen.
14. Tirtha, Ranjit (2002): *Geography of India,* Rawat Publs., Jaipur & New Delhi.
15. Tiwari, R.C. (2007): *Geography of India*. PrayagPustakBhawan, Allahabad.

GEO-CC-2320: GEOMORPHOLOGY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. To understand the associations between geomorphological and forms, concepts and processes.
2. To critically evaluate and connect information about geomorphic processes.

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Understand the functioning of Earth systems in real time and analyze how the natural and anthropogenic operating factors affects the development of landforms
2. Distinguish between the mechanisms that control these processes

UNIT	COURSE CONTENT
UNIT 1	Nature, Scope, Approaches and its relationship with other sciences, Landscape Evolution Theories: W.M.Davis, W. Penck, L.C.King, J.T. Hack, Geomorphic concepts: Uniformitarianism and Systems approach;
UNIT 2	Earth: interior structure, earth movements: continental drift, isostasy, plate tectonics, types of folds and faults, earthquakes and volcanoes
UNIT 3	Geomorphic Processes and landforms: Weathering, Mass Wasting, Fluvial, Karst, Aeolian, Glacial, and Coastal.
UNIT 4	Applied Geomorphology: Urban planning, Resource management, Geo-hazards and Environmental Management

Suggestive Readings:

1. Bloom, A. L., (2003): *Geomorphology: A Systematic Analysis of Late Cenozoic Landforms*, Prentice-Hall of India, New Delhi.
2. Bridges, E. M., (1990): *World Geomorphology*, Cambridge University Press, Cambridge.
3. Christopherson, R. W. and Birkeland, G. H., (2012) *Geosystems: An Introduction to Physical Geography* (8th edition), Pearson Education, New Jersey.
4. Das Gupta, A and Kapoor, A.N., (2001) *Principles of Physical Geography,* S.C. Chand & Co1mpany Ltd. New Delhi.
5. Dayal, P., (1996) A Text book of Geomorphology. Shukla Book Depot, Patna.

6. Huggett, R.J. (2007) *Fundamentals of Geomorphology*, Routledge, New York.
7. Kale, V. S. and Gupta A., (2001): *Introduction to Geomorphology*, Orient Longman, Hyderabad.
8. Khullar, D.R., (2012) *Physical Geography*, Kalyani Publishers, New Delhi.
9. Mal, Suraj, Singh, R.B. and Huggel, Christian (2018): *Climate Change, Extreme Events and Disaster Risk Reduction*, Springer, Switzerland, pages 309.
10. Selby, M.J., (2005): *Earth's Changing Surface,* Indian Edition, OUP
11. Singh, S (2009): *Bhautik Bhugol ka Swaroop (Hindi)*, Prayag Pustak, Allahabad.
12. Skinner, Brian J. and Stephen C. Porter (2000), *The Dynamic Earth: An Introduction to Physical Geology,* 4th Edition, John Wiley and Sons.
13. Strahler, A. H. and Strahler, A N., (2001): *Modern Physical Geography* (4/E), John Wiley and Sons, Inc., New York.
14. Summerfield M. A. (2013): Global Geomorphology, Routledge, New York
15. Thornbury, W. D., (2004): *Principles of Geomorphology*, Wiley, New York.
16. Tikka, R N (1989): *Bhautik Bhugol ka Swaroop (Hindi)*, Kedarnath Ram Nath, Meerut.

GEO-MC-2310: GEOGRAPHY OF INDIA

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. Understandingthe physical profile of the country.
2. To study the resource endowment, its spatial distribution

Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand the physical and social dimensions of the country.
2. To utilise resources for sustainable development.

UNIT	COURSE CONTENT
UNIT 1	Physical: Physiographic divisions, climatic characteristics, drainage system, soil and natural vegetation
UNIT 2	Demography: Growth and distribution, population composition (age sex, race, caste, religion, language and tribes)
UNIT 3	Economy: Agricultural regions, area and production of rice, wheat, cotton, Mineral and power resources (Iron ore, coal and petroleum), Major industrial regions, Trade and Commerce
UNIT 4	Environmental hazards: Flood, Drought, Landslide and soil erosion, Cyclone, earthquake, deforestation.

Suggestive Readings:

1. Deshpande, C. D., (1992): *India: A Regional Interpretation*, ICSSR, New Delhi.
2. Douglas, L. Johnson. (2009): World Regional Geography, Tenth edition, Pearson Education Inc, New Jersey.
3. Johnson, B. L. C., ed. (2001): *Geographical Dictionary of India*. Vision Books, New Delhi.
4. Khullar, D.R. (2014): *India: A Comprehensive Geography*, Kalyani Publishers, New Delhi.
5. Majid Husain (2009): *Geography of India*, Tata McGraw hill Education Private Ltd, New Delhi.
6. Mandal, R. B. (ed.), (1990): *Patterns of Regional Geography–An InternationalPerspective. Vol. 3–Indian Perspective*.
7. Pathak, C. R. (2003): *Spatial Structure and Processes of Development in India*. Regional Science Assoc., Kolkata.

8. Sdyasuk, Galina and P, Sengupta., (1967): *Economic Regionalization of India*, Census of India.
9. Sharma, T.C. (2013): *Economic Geography of India*. Rawat Publication, Jaipur.
10. Singh R. L., (1971): *India: A Regional Geography*, National Geographical Society of India.
11. Singh, Jagdish. (2003): *India - A Comprehensive & Systematic Geography*, Gyanodaya Prakashan, Gorakhpur.
12. Singh, R. B. and Prokop, Pawel. (2016): *Environmental Geography of South Asia,* Springer, Japan.
13. Spate O. H. K. and Learmonth A. T. A., (1967): *India and Pakistan: A General andRegional Geography*, Methuen.
14. Tirtha, Ranjit (2002): *Geography of India,* Rawat Publs., Jaipur & New Delhi.
15. Tiwari, R.C. (2007): *Geography of India*. Prayag Pustak Bhawan, Allahabad.

GEO-MD-2310: TRADITIONAL ECOLOGICAL KNOWLEDGE

Credit 3- (Credit Hours in a week: Lecture: 3)
Marks: 75 (End Term Examination = 60 and Internal Examination = 15)

Course Objective:

1. To acquaint the students about the importance of rich traditional ecological knowledge for sustainable management of natural resources

Learning Outcome:

1. After the completion of course, the students will have ability to understand the importance of traditional ecological knowledge and apply it in their day-to-day life for natural resource management

UNIT	COURSE CONTENT
UNIT 1	Meaning, concept, importance and development of TEK
UNIT 2	TEK in farming, food gathering, hunting, fishing, craft, Ethno-medicine and food preservation
UNIT 3	TEK in Conservation of biotic life, Change and Continuity: responses, perception, constraints and future prospects

Suggestive Readings

1. Sacred Ecology by Fikret Berkes: Widely considered foundational, this book explores the core theories and practical examples of TEK from diverse cultures.reddit
2. Braiding Sweetgrass by Robin Wall Kimmerer: Interweaves Indigenous wisdom and scientific knowledge, blending memoir, natural history, and philosophy.reddit
3. Ancient Pathways, Ancestral Knowledge by Nancy J. Turner: A comprehensive two-volume set on ethnobotany and ecological wisdom of Indigenous Peoples of Northwestern North America.reddit
4. Traditional Ecological Knowledge: Learning from Indigenous Practices for Environmental Sustainability (edited by Melissa K. Nelson & Dan Shilling): Focuses on the role of TEK in sustainable practices and environmental stewardship.birchbarkbooks
5. Indigenous Critical Reflections on Traditional Ecological Knowledge (edited by Lara A. Jacobs): Presents Indigenous perspectives and critical analysis of TEK frameworks.osupress.oregonstate+1

6. The Value of Traditional Ecological Knowledge for the Environmental Health Sciences and Biomedical Research by S. Finn et al. (Environmental Health Perspectives): Discusses integration of TEK into health and biomedical research and the implications for Indigenous communities.pmc.ncbi.nlm.nih

7. Traditional ecological knowledge and its role in biodiversity conservation: a systematic review by N.I. Sinthumule (Frontiers in Environmental Science): Reviews TEK's impact on biodiversity conservation, with emphasis on African case studies.frontiersin

8. Traditional ecological knowledge and natural resource management: Examples from Bangladesh (NRCR, 2024): Outlines practical applications of TEK in resource management and agricultural systems.systems.enpress-publisher

9. Traditional Ecological Knowledge (Cambridge University Press): Academic coverage of TEK, including Indigenous science, restoration ecology, and sustainability.cambridge

10. Traditional Ecological Knowledge (IUCN Working Group Report, 1989): A classic collection of scholarly articles that helped define the scope and importance of TEK in global conservation.portals.iucn

GEO-SE-2310: GEOGRAPHICAL INFORMATION SYSTEM

Credit 3- (Credit Hours in a week: Theory - 1, Practical - 2)
Marks: 75 (End Term Examination = 60 and Internal Examination = 15)

CourseObjectives:

1 This courses hall introduces the basic concepts of GIS.
2 To do analysis and application of geographical data resource management and land use land cover study.

Learning Outcomes:
After the completion of course, the students will have ability to:

1 Appreciate the basic principles and components of GIS
2 Analyze the basic resources, land use and urban related data using GIS software for meaningful interpretation

UNIT	COURSE CONTENT
UNIT 1	Geographic Information System (GIS): Definition, Components and Principles, GIS Data Structures: Types (Spatial and Non-spatial), Raster and Vector Data Structure
UNIT 2	GIS Data Analysis: Input; Geo-Referencing; Editing and Output; Overlays
UNIT 3	Application of GIS in Natural Resource Management, Urban Sprawl, Land use/Land-cover.

Suggestive Readings:

1 Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad
2 Campbell, J. B., (2007): *Introduction to Remote Sensing*, Guildford Press.
3 Chauniyal, D.D., (2010): *SudurSamvedanevam Bhogolik Suchana Pranali (Hindi)*, Sharda Pustak Bhawan, Allahabad.
4 Jensen, J. R., (2004): *Introductory Digital Image Processing: A Remote SensingPerspective*, Prentice Hall Inc., New Jersey.
5 Jensen, J.R. (2007):*Remote Sensing of the Environment: An Earth ResourcePerspective*, Prentice-Hall Inc., New Jersey.
6 Joseph, G. (2005): *Fundamentals of Remote Sensing*, United Press India.
7 Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): *Spatial InformationTechnology for Sustainable Development Goals*, Springer.

8 Lillisand, T.M., and Kiefer, P.W., (2007): *Remote Sensing and ImageInterpretation*,6thEdition, John Wiley & Sons, New York.

9 Nag, P. and Kudra, M., (1998): *Digital Remote Sensing*, Concept, New Delhi.

10 Rees, W. G., (2001): *Physical Principles of Remote Sensing*, Cambridge University Press.

11 Sarkar, A. (2015): *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi

12 Singh, R. B. and Murai, S., (1998): *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

SEMESTER IV

SEMESTER IV

GEO-CC-2410: POLITICAL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1 To critically understand the concepts of state, nation and nation-state.
2 To develop the linkages between electoral geography and politicalgeography.

Learning Outcomes:

After the completion of course, the students will have ability to:

1 Learn the concept of nation and state and geopolitical theories
2 Understand the different dimensions of electoral geography and resource conflicts

UNIT	COURSE CONTENT
UNIT 1	Nature and scope, concepts and approaches, development
UNIT 2	Concept of State, Nation and Nation State, Attributes of State- Frontiers and Boundaries, Territory and Sovereignty, Concept of Geopolitics; Theories (Heartland and Rimland)
UNIT 3	Resource Conflicts: Disputes - Water sharing, Forest Rights, Minerals (National and International).
UNIT 4	Politics of Displacement: Issues of relief, compensation and rehabilitation: Dams, Highways and forest with reference to North East India

Suggestive Readings:

1 Adhikari, S. (2007): *Political Geography*, Rawat Publication, and New Delhi.
2 Adhikari, S. (2013): *Political Geography of India* –Sharda Pustak Bhawan, Allahabad.
3 Agnew, J., (2002): *Making Political Geography*, Arnold.
4 Agnew, J., Mitchell K. and Total G., (2003): *A Companion to Political Geography*, Blackwell.
5 Cox, K. R., Low M. and Robinson J., (2008): *The Sage Handbook of PoliticalGeography*, Sage Publications.
6 Gallaher, C., et al, (2009): *Key Concepts in Political Geography*, Sage Publications.
7 Hodder, Dick, Sarah, J, Llyod and Keith, S, McLachlan., (1998): *Land Locked Statesof Africa and Asia (vo.2)*, Frank Cass
8 Jones, M., (2004): *An Introduction to Political Geography*: Space, Place and Politics, Routledg .
9 Painter, J. and Jeffrey, A., (2009): *Political Geography*, Sage Publications.
10 Taylor, P. and Flint, C., (2000): *Political Geography*, Pearson Education.

GEO-CC-2420: GEOGRAPHICAL ANALYSIS (Practical I)

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives:

1. Introduce different areas of geographical inquiry and provide students with methods to develop broad and balanced analytical skills using practical geography techniques.
2. Familiarize students with data representation methods, thematic mapping, and interpretation of various physical and cultural features through hands-on exercises such as preparation of maps, diagrams, and cartograms.

Learning Outcomes

1. Students will be able to represent, analyse, and interpret different types of geographical data using graphical, cartographic, and mapping techniques, including topographical and climate maps.
2. Students will gain practical competence in preparing and interpreting various geographical diagrams and thematic maps, and critically analysing physical and cultural features of landscapes.

UNIT	COURSE CONTENT
UNIT 1	Basic Cartography: Scales – Concept and application; Graphical Construction of Plain, Comparative and Diagonal Scales.
UNIT 2	Morphometric Analysis: Average Slope Analysis, Relief profiles, Stream ordering and bifurcation ratio
UNIT 3	Representation of Population data: Population growth, distribution, composition
UNIT 4	Map Projections: Classification, properties and uses; Merits and Demerits of Polar Zenithal, Stereographic, Bonne's and Mercator's Projections

Suggestive Readings:

1 Anson, R., and Ormelling F. J.,(1994): *International Cartographic Association: BasicCartographic, Vol.*Pregmen Press.

2 Singh, Gopal., (1998): *Map Work and Practical Geography (4th Edition)*, Vikas Publishing House, Ahmedabad.

3 Gupta, K.K. and Tyagi V.C.,(1992): *Working with Map*, Survey of India, DST, New Delhi.

4 Kraak, M.J., (2010):*Cartography: Visualization of Geospatial Data* (3rd edition), Pearson Education Ltd., London.

5 Misra, R.P.,(2014): *Fundamentals of Cartography (*Second Revised and Enlarged Edition), Concept Publishing, New Delhi.

6 Monkhouse, F. J. and Wilkinson, H. R.,(1973): *Maps and Diagrams*, Methuen, London.

7 Rhind, D. W. and Taylor D. R. F., (eds.) (1989): *Cartography: Past, Present andFuture*, Elsevier, International Cartographic Association.
8 Robinson, A. H.,(2009): *Elements of Cartography* (6th Edition), John Wiley and Sons, New York.

9 Sarkar, A.,(2015): *Practical geography: A systematic approach*, Orient Black Swan Private Ltd., New Delhi
10 Sharma, J. P., (2010): *PrayogicBhugol(Hindi)*, Rastogi Publishers, Meerut.
11 Singh, R.L. and Singh R.P.B.,(1999): *Elements of Practical Geography*, Kalyani Publishers, New Delhi.
12 Singh, R.L. &Dutta, P.K., (2012):*PrayogatmakBhugol(Hindi)*, Central Book Depot, Allahabad
13 Singh,R.L.,& Singh, Rana. P.B.,(1991):*PrayogtmakBhugolkeMoolTatva(Hindi)*, Kalyani Publishers, New Delhi
14 Steers, J.A. (1970):*An Introduction to the Study of Map Projections*, University of London Press, London.
15 Khan, Zulfequar Ahmad., (1998):*Text book of Practical Geography*, Concept Publishing Company, New Delhi.

GEO-CC-2430: REGIONAL PLANNING

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1 To understand the concept of region and planning process involve in it.
2 To examine factor responsible for development disparities and sustainable development

Learning Outcome:
After the completion of course, the students will have ability to:

1 Understand the techniques involve in regional planning and development.
2 Understand the key component of the sustainable development

UNIT	COURSE CONTENT
UNIT 1	Nature and scope of Regional Planning, Approaches, Methods, Techniques, Theories and models,
UNIT 2	Concept of Region; Types of Regional Planning, Role of Regional Planning in National Development, Planning regions of India
UNIT 3	Concept and factors affecting rural development, Causes and measurement of regional disparity, indicators of development and regional disparities in India
UNIT 4	Sustainable Development: Indicators, Goals, strategies, policies and programmes

Suggestive Readings:

1 Bernstein, H. (1979): Sociology of Development versus Sociology of Underdevelopment in D. Lehmann (ed.), Development Theory: Four Critical Studies, Cass, London
2 Brookfield, H.C. (1975): Interdependent Development, Methuen, London
3 Cary, J. Hudson, R. and Lewis, J. (ed) (1980): Regions in Crisis, Croom Helm, London.
4 Dewar, D. et al (1986): Regional Development and Settlement Policy, Allen and Unwin, Boston
5 Forbes, D.K. (1984): The Geography of Underdevelopment: A critical survey, Croom Helm, London
6 Hall, P. (1981): Urban and Regional Planning, Allan and Unwin, Boston.

7 Hansen, N.N. (1972): Growth Centres in Regional Economic Development, Macmillan, London
8 Kuklinski, A. (1975): Regional Development and Planning, Sythoff, London
9 Mishra, R.P., K. V. SUndaram and V.L.S.P. Rao (1974): Regional Development Planning
in India, Viking, Delhi
10 Stohr, W.B. and Taylor, D.R.F. (1981): Development from above or Development from Below, John Wiley, Chichester.

GEO-2440 Field Work

GEO-MC-2410: POPULATION GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1 It introduces the basic concepts of population Geography to the students.
2 An understanding of the importance and need of Demographic data in understanding of population dynamics.

Learning Outcome:
After the completion of course, the students will have ability to:

1 Learn the role of demography and population studies as a distinct fields of human geography
2 Have sound knowledge of key concept, different components of population along with its drivers and examine population dynamics and characteristic with contemporary issues

UNIT	COURSE CONTENT
UNIT 1	Nature, scope and approaches, relation with demography and other social science, population resource relationship
UNIT 2	Population Growth and Distribution: Population growth, trend and distribution, Determinants of Population Change: fertility, mortality and migration
UNIT 3	Population Theories: Malthus, Marx, Boserup, Demographic Transition Model
UNIT 4	Population Composition: Age and Sex composition, rural-urban composition, concept of ageing, demographic dividend,

Suggested Readings:

1 Boserup, E. (1965): The conditions of Agricultural Growth, G. Allen and Unwin, London
2 Bhendea, A and Kanitkar, T. (1985): Principles of Population Studies, Himalayan Publishing House, Mumbai.
3 Chandana, R. C. and Sidhu, M. S. (1980): Introduction to Population Geography, Kalyani Publishers, Ludhiana.
4 Clarke, J. L. (1992): Population Geography, Pergamon Press, Oxford.
5 Demko, G. J., Rose, H. M. and Schnell, G. A. (1979): Population Geography: A Reader, Mc Graw Hill, New York.
6 Dubey, R. M. (1981): Population Dynamics in India, Chugh Publications, Allahabad.
7 Mandal, R. B., Uyanga, J and Prasad, H. (1989): Introductory Methods in Population Analysis, Concept Publishing, New Delhi.
8 Sundaram, K. V. and Nangia, S. (1985): Population Geography, Heritage, New Delhi.

9 Samuel H. Preston (2000). Demography: Measuring and modeling population processes, Willey – Blackwell.
10 Thomas Robert Malthus and Geoffrey Gilbert (1999). An Essay on the principles of Population, Oxford University Press, USA.

SEMESTER V

SEMESTER V

GEO-CC-3510: CLIMATOLOGY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1 Various dimensions of climatology-like structure andcomposition.
2 Detailed analysis of global atmospheric pressure and wind system.

Learning Outcomes:
After the completion of course, the students will have ability to:

1 Understand the elements of weather and climate and its impacts at different scales.
2 Comprehend the climatic aspects and its bearing on planet earth.

UNIT	COURSE CONTENT
UNIT 1	Nature, Scope and Approaches, relationship with meteorology
UNIT 2	Composition and Structure of Atmosphere, Insolation and Vertical and Horizontal distribution of Temperature, Heat Budget, Temperature Inversion
UNIT 3	Atmospheric Pressure and Winds: Planetary Winds, General Circulation of Air, Jet Streams; Monsoon - Origin and Mechanism, El Nino, La Nina, Evaporation, Humidity, Condensation, Fog and Clouds, Precipitation Types, Stability and Instability; Climatic Regions
UNIT 4	Atmospheric Disturbances and Classification of climate: Cyclones and Fronts: Tropical Cyclones, Temperate Cyclones, Classification of Climate; Koppen classification, Contemporary Issues: Global warming, Ozone depletion, Climate Change

Suggestive Reading:

1 Anikouchine, W. A. and Sternberg, R. W., (1973): *The World Oceans: An Introductionto Oceanography*, Prentice-Hall.
2 Barry, R. G., and Chorley, R. J., (2009): *Atmosphere, Weather and Climate (9th Edition)*,Routledge, New York.
3 Bhutani, S., (2000): *Our Atmosphere*, Kalyani Publishers, Ludhina.
4 Critchfield, H. J., (1987): *General Climatology*, Prentice-Hall of India, New Delhi
5 Gupta, L.S., (2000): *JalvayuVigyan(Hindi)*,MadhyamKaryanvayNidishalya, Delhi VishwaVidhyalaya, Delhi

6 Kershaw, S., (2000): *Oceanography: An Earth Science Perspective*, Stanley Thornes, UK.
7 Lal, D. S., (2006): *JalvayuVigyan(Hindi)*,, PrayagPustakBhavan, Allahabad
8 Lutgens, F. K., Tarbuck E. J. and Tasa D., (2009): *The Atmosphere: An Introduction toMeteorology*, Prentice-Hall, Englewood Cliffs, New Jersey.
9 Oliver, J. E., and Hidore J. J., (2002): *Climatology: An Atmospheric Science*, Pearson Education, New Delhi.
10 Pinet, P. R., (2008): *Invitation to Oceanography* (Fifth Edition), Jones and Barlett Publishers, USA, UK and Canada.
11 Singh, S., (2009): *Jalvayu Vigyan (Hindi)*,, Prayag Pustak Bhawan, Allahabad
12 Strahler, A.N., (1987) *Modern Physical Geography*, John Wiley and Sons, New York, Singapore.
13 Sverdrup, K. A. and Armbrust, E. V., (2008): *An Introduction to the World Ocean*, McGraw Hill, Boston.
14 Trewartha, G. T., and Horne L. H., (1980): *An Introduction to Climate*, McGraw-Hill.

GEO-CC-3520: AGRICULTURAL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1 To understand the concept of land use/landcover classification and determinants of agriculture.
2 To familiarize the students with agriculture regions of India and various types of agriculture system in India.
3 To analyze the food security along with various agricultural revolutions and government policies in India.

Learning Outcome:
After the completion of course, the students will have ability to:

1 Conceptualize the agriculture and its determinants.
2 Get the overview of Indian and World agriculture regions and systems.
3 Have sound knowledge of agriculture revolutions and food security

UNIT	COURSE CONTENT
UNIT 1	Nature, Scope, significance and development, Approaches, relationship with other allied disciplines,
UNIT 2	Determinants of agriculture: Physical, Social, Economic, Technological, Institutional
UNIT 3	Agricultural Systems of the World (Whittlesey's classification) and Agro climatic regions of India, Agricultural Land use model (Von Thunen, modification and relevance).
UNIT 4	New Perspective in agriculture development: Green revolution, white revolution, blue revolution and sustainable agriculture

Suggestive Readings:

1 Basu, D.N., and Guha, G.S., (1996): *Agro-Climatic Regional Planning in India*, Vol.I& II, Concept Publication, New Delhi.
2 Bryant, C.R., Johnston, T.R, (1992): *Agriculture in the City Countryside*, Belhaven Press, London.
3 Burger, A., (1994): *Agriculture of the World*, Aldershot, Avebury.
4 Grigg, D.B., (1984): *Introduction to Agricultural Geography*, Hutchinson, London.
5 Hussain, M. (1996):*Systematic Agricultural Geography*, Rawat Publications, Jaipur.

6 Ilbery, B. W., (1985): *Agricultural Geography: A Social and Economic Analysis*, Oxford University Press.
7 Mohammad, N., (1992): *New Dimension in Agriculture Geography*, Vol. I to VIII, Concept Pub., New Delhi.
8 Roling, N.G., and Wageruters, M.A.E.,(ed.) (1998): *Facilitating SustainableAgriculture*, Cambridge University Press, Cambridge.
9 Shafi, M., (2006): *Agricultural Geography*, Doring Kindersley India Pvt. Ltd., New Delhi
10 Singh, J., and Dhillon, S.S., (1984): *Agricultural Geography*, Tata McGraw Hill, New Delhi.
11 Tarrant, J. R., (1973): *Agricultural Geography*, David and Charles, Devon.

GEO-CC-3530: HUMAN GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives:

1. To develop a compréhensive understanding of foundational and contemporary concepts in Human Geography.
2. To analyse patterns and processes shapinh human populations, cultures, economic activities and political structure.
3. To encourage critical thinking and application of geographical methods and tools.

Learning Outcome:

1. Will be able to explain and apply key human geography concepts and theories
2. Will demonstrate the ability to critical analyze spatial patterns and processes
3. Will evaluate and propose solutions to issues related to development, equity and sustainability.

UNIT	COURSE CONTENT
UNIT 1	**Foundations of Human Geography**: Evolution and Significance of Human Geography; Concept of Place, Space and Landscape **Human-Environment Interaction:** Environmental Determinism, Possibilism, and Neo-determinism; Climate Change and Human Adaptation. **Approaches and Methods:** Qualitative and Quantitative approaches, Role of GIS and remote sensing in the study of Human Geography.
UNIT 2	**Languages, Religions, and Ethnicities:** Cultural landscapes and spatial expressions of diversity and identity with reference to North East India; Threats to Indigenous cultures and languages with reference to Arunachal Pradesh. **Communities and Livelihoods**: Focus on marginalized groups- women and indigenous peoples; Impact of technological change on traditional livelihoods.
UNIT 3	**Economic Activities**: Concept and Relevance of economic activities, Classification -primary, secondary, tertiary, quaternary and quinary **Political Expression of Geographies:** Nation, State, and Nation-State in a globalized world; Contemporary issues: Boundaries disputes and geopolitics of resources
UNIT 4	**Development Discourses**: Concept of Inclusive economic growth and sustainable development.; SDGs (Sustainable Development Goals). **Indicators and Measurement**: Concept of Gender Development Index (GDI) and Multidimensional Poverty Index (MPI) **Future Challenges and Management**: Disaster management - mitigation, risk reduction, and resilience; Displaced communities and humanitarian issues.

Reading List:

1. Bergwan, Edward E., Human Geography: Culture. Connections and Landscape, Prentice Hall, New Jersey. 1995

2. Carr, M., Patterns, Process and change in Human Geography, MacMillan Education, London, 1987
3. Daniels Peter, Bradshaw Michae, Shaw Davil and Side way James, Human Geography: Issues for the Twenty First Century, Prentice Hall, New Jersey, 2001
4. Fellman, J.L., Human Geography-Landscapes of H u m a n Activities, Brownand Benchman Pub., U.S.A, 1997
5. DeBlij, H.J., Human Geography, Culture, Society and Space John Wiley, New York, 1996
6. James, M. Robenstein, An Introduction to Human Geography, Prentice Hall, New Jersey, 2001
7. Johnston, R.J. (editor), Dictionary of Human Geography Blackwell, Oxford, 1994.
8. Mc Bride, P.J., Human Geography: Systems, Patterns and Change, Nelson, U.K. and Canada, 1996
9. Michael, Can, New Patterns: Process and Change in Human Geography Nelson, 1997
10. Rubenstein, J.H. and Bacon, R.S., The Cultural Landscape -A Introduction to Human geography, Prenice Hall, India, New Delhi, 1990
11. Alexander, John W.: Economic Geography
12. Human Geography: Landscape, Culture and Society- H.J de Blij, A. B. Murphy, Erin H. Fouberg
13. Human Geography: Places and Regions in Global Context- Paul Knox & Sallie Marston
14. The Dictionary of Human Geography- Gregory, Johnston, Pratt, Watts, Whatmore.

GEO-CC-3540: GEOGRAPHICAL ANALYSIS (Practical II)

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Develop an understanding of key statistical and graphical methods (such as measures of central tendency, climatic data representation, and standard deviation) necessary for geographical data analysis.
2. Equip students to apply and interpret quantitative techniques, including agricultural indices and urban indicators (Rank Size Rule, Lorenz Curve, Gini Coefficient, z-score), for spatial and socio-economic analysis.

Learning Outcomes

1. Students will be able to analyse and represent various sets of geographical data using appropriate statistical tools and diagrams, including mean, median, mode, standard deviation, and specialized climatic graphs.
2. Students will demonstrate the ability to calculate and interpret agricultural indices and socio-economic measures (like cropping intensity, crop diversity, crop specialization, Lorenz Curve, Gini Coefficient), enhancing their skill in recognizing and articulating development disparities and spatial trends

UNIT	COURSE CONTENT
UNIT 1	Measures of Central Tendency: Mean, median, mode, range, quartile, standard deviation
UNIT 2	Representation of Climatic data: Hythergraph, climatograph, climograph, ergograph, water balance
UNIT 3	Estimation of Agricultural Indices: Crop diversity, crop combination, cropping intensity, crop specialisation
UNIT 4	Rank size rule, Lorenz Curve, Ginni Coefficient, z- score

Suggestive Readings:

1 Alvi Z. : Statistical Geography, Rawat Bookseller

2 Burt, J. E., Barber, G. M., & Rigby, D. L. (2009). *Elementary statistics for geographers*. Guilford Press.

3 J. Chapman McGrew, Charle: An Introduction to Statistical Problem solving in Geography

4 Mahmood, Aslam (1977): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi

5 Peter A. Rogerson: Statistical Methods for Geography: A Student's Guide

6 Bygott, G.L: Mapworks and Practical Geography

7 Mahmood, A. (1977): Statistical Methods in Geographical Studies, Rajesh Publications, New Delhi.

8 Mishra, R.P and Ramesh, A. (1969): Fundamentals of Cartography, Concept Publishing Company, New Delhi.
9 Singh, R.L. and Singh, Rana, P.B. (1991): Elements of Practical Geography, Kalyani Publishers, Ludhiana.
10 Singh, R.L and Singh, R. (1991): Mapwork and Practical Geography, Central Book Depot, Allahabad.
11 Wilkinson, H.R. and Monkhouse, F.J. (1952): Maps and Diagrams, B.I. Publications, Pvt. Ltd, New Delhi.
12 Chorley, R. J., & Haggett, P. (2013). Integrated Models in Geography (Routledge Revivals).

GEO-MC-3510: ECONOMIC GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-3, Practical-1)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. To introduce students to the fundamental concepts, nature, scope, and recent trends in economic geography and its relationship with economics and related disciplines.
2. To develop an understanding of resource classification, distribution, and the principles of conservation and sustainable management of natural and mineral resources.
3. To analyze the spatial distribution and factors influencing primary, secondary, and tertiary economic activities, including agriculture, industry, transport, and trade.

Learning Outcomes

1. Students will be able to define and explain key concepts in economic geography, including economic activities and their classifications.
2. Students will understand the types and global distribution of natural and mineral resources and the importance of sustainable resource management.
3. Students will acquire the ability to assess the geographic factors influencing the location and development of industries, transport systems, and trade patterns at both national and international levels.

UNIT	COURSE CONTENT
UNIT 1	**Introduction** 1. Definition, nature, scope and recent trends in economic geography. 2. Its relation with economics and allied subjects. 3. Concept and classification of Economic Activities – Primary, Secondary and Tertiary.
UNIT 2	**Resources i. Definition, Concept and classification of Resources** 1. Classification of Natural Resources. 2. Classification of minerals; ferrous and non-ferrous and their world distribution, energy minerals and resources; 3. Conservation and management of Resource for sustainable Development.
UNIT 3	**Primary Activities** 1 Distribution primary economic activities- mining, forestry, fishing. 2 Agriculture-physical, social, cultural environment influencing crop production; spatial distribution of major food and cash crops of the world.
UNIT 4	**Secondary and Tertiary Activities** 1 Industries- factors of localization, major industries-iron and steel, textile, chemicals, paper; 2 Transport: geographical factors in their development, major water, land and air transport; 3 Internal and international trade.

Reading List:

1. Boesch, H., A Geography of World Economy, D.Van Nostrand Co., New York, 1964
2. Chapman, J.D., Geography and Energy, Longman, London, 1989
3. Gregor, H.F., Geography of Agriculture, Prentice Hall, New Jersey, USA, 1970
4. Griggs, D.B., The Agricultural Systems of the World, Cambridge University Press, New York, 1974
5. Hartshorne, T.N. and Alexander, J.W., Economic Geography, Prentice Hall, New Delhi, 1988
6. Jones, C.F. and Darkenwald, G.G., Economic Geography, McMillan Co., New York.1975
7. Millar, E., Geography of Manufacturing, Prentice Hall, New York, 1962
8. Neil Coe, Philip Kelly, and Henry Wai-Chung Yeung, Econonomic Geography: A Contemporary Introduction, Wiley-Blackwell, New York, 2007
9. Raza, M. and Agrawal, Y., Transport Geography of India, Concept, New Delhi, 1986
10. Baldwin, Richard, Rikard Forslid, Philippe Martin, Gianmarco Ottaviano, Frederic Robert Nicoud, Economic Geography and Public Policy, Princeton University Press, New Jersey, 2005

GEO-IN-3510: INTERNSHIP (Mandatory)

Credit 2 in Summer Break

All students will also undergo internships / Apprenticeships **during the summer term** under a mentor

Students will be provided with opportunities for internships

1. Research Institute, Science Laboratory
2. One month training program
3. Work with govt. registered local industry, business organizations, and health services
4. Work with local governments (such as panchayats, municipalities, town committee, municipal committee),
5. Work with any Govt. sponsored project
6. Work with media organizations, artists, crafts persons etc.
7. Community engagement and service with Govt. Reg. NGO
8. Field-based Work with Researcher.

SEMESTER VI

Dean Faculty of Environmental Science, RGU

SEMESTER VI

GEO-CC-3610: REMOTE SENSING AND GIS

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. This courses hall introduces the basic concepts of remote sensing and GIS.
2. This paper shall elucidate about aerial photography, its basic Principles and types, satellite remote sensing.

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the strength and application of remote sensing and GIS
2. To gain knowledge on aerial photographs, satellite data and its uses.

UNIT	COURSE CONTENT
UNIT 1	Bases of Remote Sensing: Definition and historical development, Interaction of Electro-Magnetic Radiation (EMR) with atmosphere and earth surface, Satellite and Sensors, Concept of Resolution
UNIT 2	Aerial Photographs and Photogrammetry: Types of Aerial photos, Fundamentals of air photographs interpretation, Geometry of aerial photographs: tilt and relief displacement
UNIT 3	Digital Image Processing: Rectification, Restoration, Enhancement, Classification: unsupervised and supervised
UNIT 4	Geographical Information System and GNSS: Concepts and data capture, Spatial Analysis: single layer, multiple layer, Global Navigation Systems (GNSS), Application in Environmental Studies

Suggestive Readings

1. Barret, E.C. and Curtis, L.F. (1976): Introduction to Environmental Remote Sensing, John Wiley and Sons, New York.
2. Camphell, J.B. (1983): Mapping the land, American Association of Geographers, Reprint in India, Scientific Publisher, Jodhpur.
3. Cromley, R. G. (1992). Digital cartography (p. 43). Englewood Cliffs: Prentice Hall.
4. Kathuria C.D.: Remote Sensing and Geographical Information System

5. Luder, D. (1959): Aerial Photography Interpretation: Principles and Applications, Mc Graw Hill, New York
6. Markandey K: Urban Environment and Geoinformatics
7. Nag P: Introduction to Geographical Information System.
8. Ramaswamy SM: Remote Sensing in Water Resources
9. Sabins Flyed, F. (1978): remote sensing: principles and interpretation, San Francisco, WH france

GEO-CC-3620: GEOGRAPHIC THOUGHT

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives:

1. To understand the historical evolution of geographic thought.
2. To explore different paradigms and contemporary trends in geography.

Learning Outcome:

After the completion of course, the students will have ability to:

1. Understand the geographical thinking in different regions of world
1. Distinguish paradigms and postmodern concepts in geography

UNIT	COURSE CONTENT
UNIT 1	Development of Geographical ideas: Indian, Greek, Roman and Arab
UNIT 2	Development of Modern Geography: Impact of Explorations and Discoveries, Founders of Modern Geography: Humboldt and Ritter
UNIT 3	Dichotomies in Geography: Physical and Human, Determinism and Possibilism, Regional and Systematic, Emergence of New Geography: Quantitative Revolution
UNIT 4	Schools of Geographic Thought: German, French, Anglo-American, Modern themes: Behavioural, Radical, Humanistic and Post modernism

Suggestive Readings:

1. Bunge, W. (1966): Theoritical Geography, Lund University, Series C
2. Dubey, B. (1967): Geographical Concept in Ancient India – NGSI, Varanasi
3. Dickinson, R.G. (1969): The Makers of Modern Geography, Routledege Kegan Paul, London
4. Harthshorne, R. (1939): The Nature of Geography, Association American Geography, O. Loncester
5. Hussain, M: Evolution of Geographical Thought, Rawat Publication, Jaipur
6. Misra, R.P. (1983 ed.): Contributions to Indian Geography Concepts and Approaches, Heritage Publication, New Delhi.
7. Taylor, G (1953 ed.): Geography in the 20th Century, Methuen, London

8. Tripathi, M.P: Development of Geographic Knowledge in Ancient India, Bharatiya Vidya Prakashan, Varanasi.
9. Wooldrige, S.W. (1960): Geographer as a Scientist, London

GEO-CC-3630: SETTLEMENT GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. To acquaint the students about the rural and urban settlement.
2. To understand theories, models and approaches

Learning Outcomes:

After the completion of course, the students will have ability to:

1. Appreciate the types and patterns of rural and urban settlement.
2. Apply various concepts and theories in rural and urban development

UNIT	COURSE CONTENT
UNIT 1	Nature, scope and approaches of settlement geography, Human Settlements: Factors, Classification, Types and Patterns: Rural, Urban. Structure and morphology of Rural settlement types, Emergence of Patterns of house types and building materials,
UNIT 2	Classification of Settlements: Dichotomy of settlement: rural and urban, Rural: classification, function of village and environment relationship, Morphology of rural settlement; Rural service centre and market; Rural problems and planning. Urban: definition, Salient features of Indian urbanization
UNIT 3	Settlement System: Concept, origin, growth, and classification, of town, Models and Theories of urban growth, Concept of rank size rule and the primate city, characteristics of urban centres, functions, population, transport and market
UNIT 4	Urban hierarchy: Urbanization and conurbation; Rural urban fringe and Umland, Rural-urban linkages in context of metropolitan system in India, Urban problems and urban slum, Urban planning and Smart City Project of India

Suggestive Readings:

1. Maurya, S.D. (2014): Settlement Geography, Sharda Pustak Bhawan, Allahabad.
2. Singh, R.Y. (2002): Geography of Settlements, Rawat Publications, Jaipur.
3. Sinha, V.N.P., Verma, Usha and Sahay, Anuradha (2017): Introduction to Settlement Geography, Rajesh Publications, New Delhi.
4. Singh, K.P. (2012). Population and Settlement Geography. New Delhi: Axis Publications
5. Singh, R.L. and K.N. Singh (eds. 1975). Readings in Rural Settlement Geography. Varanasi: Geographical Society of India.
6. Trewartha, G. T. (1969). A Geography of Population: World Patterns. New York: John Wiley.

GEO-CC-3640: GEOGRAPHICAL ANALYSIS (Practical 3)
Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. This courses hall introduces the basic concepts of remote sensing.
2. This paper shall elucidate about aerial photography, its basic principles and types, satellite remote sensing.
3. This courses hall provide detailed understand in related to interpretation and application of remote sensing and GIS.

Learning Outcomes:
After the completion of course, the students will have ability to:

1. Appreciate the strength and application of remote sensing
2. Map the resources, their location and availability
3. Apply this knowledge for sustainable development

UNIT	COURSE CONTENT
UNIT 1	Interpretation and Application of Remote Sensing: Base map, Land use/ Land Cover, Urban Sprawl Analysis
UNIT 2	Interpretation and Application of Remote Sensing: Forests Monitoring, Water Resources and Natural hazards
UNIT 3	Image Processing (Digital and Manual): Pre-processing (Radiometric and Geometric Correction); Enhancement (Filtering); Classification (Supervised and Un-supervised)
UNIT 4	GIS Data Analysis: Georeferencing of maps and images (coordinate & feature based) and Mosaicing, PCA and Band rationing (NDVI, NDWI)

Suggestive Readings:

1. Anji Reddy, M. (2008): Textbook of Remote Sensing and Geographic Information System, B.S. Publication, Hyderabad
2. Campbell, J. B., (2007): *Introduction to Remote Sensing*, Guildford Press.
3. Chauniyal, D.D., (2010): *SudurSamvedanevam Bhogolik Suchana Pranali (Hindi)*, Sharda Pustak Bhawan, Allahabad.
4. Jensen, J. R., (2004): *Introductory Digital Image Processing: A Remote SensingPerspective*, Prentice Hall Inc., New Jersey.

5. Jensen, J.R. (2007): *Remote Sensing of the Environment: An Earth ResourcePerspective*, Prentice-Hall Inc., New Jersey.
6. Joseph, G. (2005): *Fundamentals of Remote Sensing*, United Press India.
7. Kumar, Dilip, Singh, R.B. and Kaur, Ranjeet (2019): *Spatial InformationTechnology for Sustainable Development Goals*, Springer.
8. Lillisand, T.M., and Kiefer, P.W., (2007): *Remote Sensing and ImageInterpretation*,6thEdition, John Wiley & Sons, New York.
9. Nag, P. and Kudra, M., (1998): *Digital Remote Sensing*, Concept, New Delhi.
10. Rees, W. G., (2001): *Physical Principles of Remote Sensing*, Cambridge University Press.
11. Sarkar, A. (2015): *Practical geography: A systematic approach*. Orient Black Swan Private Ltd., New Delhi
12. Singh, R. B. and Murai, S., (1998): *Space-informatics for Sustainable Development*, Oxford and IBH Pub.

GEO-MC-3610: REMOTE SENSING AND GIS

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

CourseObjectives:

1. This courses hall introduces the basic concepts of remote sensing and GIS
2. This papers hall elucidate about aerial photography, its basic principles and types, satellite remote sensing.

Learning Outcomes:

After the completion of the course, the students will have the ability to:

1. Appreciate the strength and application of remote sensing and GIS
2. To gain knowledge on aerial photographs, satellite data and its uses.

UNIT	COURSE CONTENT
UNIT 1	Bases of Remote Sensing: Definition and historical development, Interaction of Electro-Magnetic Radiation (EMR) with atmosphere and earth surface, Satellite and Sensors, Concept of Resolution
UNIT 2	Aerial Photographs and Photogrammetry: Types of Aerial photos, Fundamentals of air photographs interpretation, Geometry of aerial photographs: tilt and relief displacement
UNIT 3	Digital Image Processing: Rectification, Restoration, Enhancement, Classification: unsupervised and supervised
UNIT 4	Geographical Information System and GNSS: Concepts and data capture, Spatial Analysis: single layer, multiple layer, Global Navigation Systems (GNSS), Application in Environmental Studies

Suggestive Readings:

1. Barret, E.C. and Curtis, L.F. (1976): Introduction to Environmental Remote Sensing, John Wiley and Sons, New York.
2. Camphell, J.B. (1983): Mapping the land, American Association of Geographers, Reprint in India, Scientific Publisher, Jodhpur.
3. Cromley, R. G. (1992). Digital cartography (p. 43). Englewood Cliffs: Prentice Hall.
4. Kathuria C.D.: Remote Sensing and Geographical Information System

5. Luder, D. (1959): Aerial Photography Interpretation: Principles and Applications, Mc Graw Hill, New York
6. Markandey K: Urban Environment and Geoinformatics
7. Nag P: Introduction to Geographical Information System.
8. Ramaswamy SM: Remote Sensing in Water Resources
9. Sabins Flyed, F. (1978): remote sensing: principles and interpretation, San Francisco, WH france

SEMESTER VII

GEO-CC-4710: RESEARCH TRENDS IN PHYSICAL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. To introduce students to key research themes in physical geography, including geomorphology, hydrology, and climatology, with emphasis on contemporary environmental issues.
2. To familiarize students with recent trends and research findings at global, regional, and local levels in the field of physical geography.
3. To develop skills in analytical methods and practical techniques for data collection, spatial analysis, and environmental modeling in physical geography.

Learning Outcomes

1. Students will be able to explain and analyze important physical geography processes such as watershed dynamics, river morphology, and climate change impacts.
2. Students will gain the ability to apply advanced analytical methods including hydrological data analysis, spatial interpolation, and remote sensing indices in physical geography research.
3. Students will develop competencies in practical data collection and analytical techniques, such as terrain and climate data collection, river sediment analysis, and flood frequency assessment.

UNIT	COURSE CONTENT
UNIT 1	Themes of Research in Physical Geography Geomorphology: Watershed characterization; Topographic Data from Satellites; Geomorphological Mapping; River Bank erosion Hydrology: Watershed hydrology, Extreme events, River Management, water budgeting, Water indices Climatology: Climate change and its impacts, Land Surface Temperature, Drought
UNIT 2	Recent Trends: Understanding global, regional and local level issues from recent publications in the field of Physical Geography
UNIT 3	Analytical Methods in Physical Geography: Hydrological Data analysis: Base-flow separation, Overland flow measurement, Hydrograph analysis Spatial Interpolation: Trend Surface Analysis, IDW Weighted Overlay analysis of geo-environmental parameters Image data derivatives: NDVI. NDWI, NDPI, LST
UNIT 4	Data Collection and Analytical Techniques (Practical) Topographic data collection; Terrain Analysis; River Morphological analysis; spatial modeling techniques River data collection; techniques for Sediment Flux analysis; Extreme event analysis, Flood frequency and Return Period analysis. Climate Data Collection Methods; Daily-Monthly-Annual data variability: ARIMA and seasonal decomposition; Spatial Interpolation

Suggestive Readings:

1. *Easter, K. W., Dixon, J. A., & Hufschmidt, M. M. (Eds.). (1991). Watershed resources management: studies from Asia and the Pacific. Institute of Southeast Asian Studies.*

2. *Gregersen, H. M., Ffolliott, P. F., & Brooks, K. N. (Eds.). (2007). Integrated watershed management: Connecting people to their land and water. CABI.*
3. *Goudie, A. (Ed.). (2003). Geomorphological techniques. Routledge.*
4. *Heathcote, I. W. (2009). Integrated watershed management: principles and practice. John Wiley & Sons.*
5. *Mitchell, C. W. (2014). Terrain evaluation. Routledge.*
6. *Randhir, T. (2006). Watershed management. IWA Publishing.*
7. *Smith, M. J., Paron, P., & Griffiths, J. S. (2011). Geomorphological mapping: methods and applications (Vol. 15). Elsevier.*
8. *Westervelt, J. (2001). Simulation modeling for watershed management. Springer Science & Business Media.*
9. *Peckham, R. J., & Gyozo, J. (2007). Digital terrain modelling. Springer-Verlag Berlin Heidelberg.*
10. *Zhou, Q., Lees, B., & Tang, G. A. (Eds.). (2008). Advances in digital terrain analysis. Springer Science & Business Media.*
11. *Teegavarapu, R. S., Salas, J. D., & Stedinger, J. R. (Eds.). (2019, April). Statistical Analysis of Hydrologic Variables: Methods and Applications. American Society of Civil Engineers.* 22

Journals:

Geomorphology: https://www.journals.elsevier.com/geomorphology

Earth Surface Processes and Landforms: https://onlinelibrary.wiley.com/journal/10969837

Zeitschrift für Geomorphologie: https://www.schweizerbart.de/journals/zfg

Journal of Indian Geomorphology: https://indiageomorph.org/journal

Computer and Geosciences: https://www.journals.elsevier.com/computers-and-geosciences

Journal of Hydrology: https://www.journals.elsevier.com/journal-of-hydrology

Hydrology: https://www.mdpi.com/journal/hydrology

Hydrological Sciences Journal: https://www.tandfonline.com/toc/thsj20/current

Water Resource Journal: https://agupubs.onlinelibrary.wiley.com/journal/19447973

Journal of Climatology: https://www.hindawi.com/journals/jcli/

International Journal of Climatology: https://rmets.onlinelibrary.wiley.com/journal/10970088

Mausam: https://metnet.imd.gov.in/imdmausam/

Journal of the Indian Society of Remote Sensing: https://www.springer.com/journal/12524/

GEO-CC-4720: RESEARCH TRENDS IN BIOGEOGRAPHY

Credit 4-(Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objective:

1. Foundational Knowledge: Introduce students to core principles of biogeography, including ecological and evolutionary processes shaping species distribution.
2. Historical Context: Explore the role of geological events (e.g., continental drift) and historical climate changes in shaping biodiversity patterns.
3. Applied Skills: Equip students with tools to analyze human impacts on ecosystems and develop conservation strategies for biodiversity hotspots.

Learning Outcome:

1. Analytical Skills: Students will analyze biogeographic patterns (e.g., species richness gradients) using ecological and historical data.
2. Critical Evaluation: Evaluate the ecological and socioeconomic consequences of invasive species, deforestation, and climate change.
3. Practical Application: Apply interdisciplinary approaches (e.g., GIS, remote sensing) to address real-world conservation challenges.

UNIT	COURSE CONTENT
UNIT 1	**Introduction to Biogeography** **Overview of Biogeography** 1 Definition and scope of biogeography 2 Historical development and key figures in the field **Ecological Principles** 1 Basic ecological concepts relevant to biogeography 2 Bio-energy cycles and energy budgets in ecosystems
UNIT 2	**Distribution Patterns** 1 Geographic distribution of flora and fauna 2 Factors influencing species distribution (climate, soil, human activities) **Historical Biogeography** 1 Evolutionary Mechanisms 2 The role of evolution in shaping Biogeographic patterns 3 Speciation and extinction events
UNIT 3	**Ecological Biogeography** 1 Ecosystems and Biomes 2 Classification of major biomes (tropical rainforests, deserts, tundra, etc.) 3 Interactions between biotic communities and their environments **Human Impacts on Biogeography** 1 Anthropogenic effects on species distributions (urbanization, deforestation) 2 Conservation strategies to mitigate human impacts

UNIT 4	**Human Impacts on Biogeography** 1 Anthropogenic effects on species distributions (urbanization, deforestation) 2 Conservation strategies to mitigate human impacts **Biodiversity and Conservation** 1 Importance of biodiversity in ecosystems 2 Protected areas and biodiversity hotspots

Suggestive Readings:

1. **"Biogeography: An Ecological and Evolutionary Approach"** by Cox, Moore, and Ladle (9th Edition): A comprehensive and widely cited textbook, this book addresses both classic principles and contemporary research methods in biogeography, including ecological, evolutionary, and molecular approaches.mariomairal
2. **"Biogeography (A Very Short Introduction)"** by Mark V. Lomolino: This concise text introduces historical development, essential principles, research tools, and conservation strategies in biogeography, making it ideal for a quick yet thorough overview of research trends.india.oup
3. **"Simplified Biogeography (2025 Edition)"** by Dr. Krishnanand: Especially useful for structured learning, it provides clear explanations, diagrams, updated research chapters, and applied examples for a broad understanding.geographyebooks
4. **"Science maps for biogeography—The field's place within the sciences and its change over the past quarter century"** by Renner and Skov (Journal of Biogeography, 2023): Analyzes evolving disciplinary trends, research foci, and the expanded scope of modern biogeography, providing graphical science mapping of research patterns.onlinelibrary.wiley
5. **"The Main Directions and Tasks of Pure and Applied Biogeography"** by László Hufnagel: Focuses on cutting-edge topics such as biodiversity, conservation, impacts of climate change, and new analytical methods in biogeographical research.ndl.ethernet
6. **"Foundations of Biogeography"** (BiblioVault): A collection of seminal works tracing the intellectual history and evolution of the field, crucial for understanding key paradigms and turning points.
7. **ScienceDirect Topics: Biogeography**: Offers a curated overview of concepts, case studies, and links to the latest research and applied trends in biogeographical analysis.
8. **Environmental Biogeography (GEO4300, University of Florida)**: Course notes and reading packets covering research methods, hypothesis development, macroecology, and landscape-level analysis, useful for practical aspects and project work.

GEO-CC-4730: RESEARCH TRENDS IN HUMAN GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Examine the evolution, concepts, and major themes in human and cultural geography, including social structures and spatial patterns.
2. Analyse demographic, socio-economic, and rural development issues in India, with special attention to inequalities and regional strategies.

Learning Outcomes

1. Students will be able to critically evaluate social and cultural processes shaping human landscapes and identify trends in social diversity and inequality.
2. Students will develop skills to analyse demographic and development challenges, focusing on regional disparities and policy strategies for balanced growth.

UNIT	COURSE CONTENT
UNIT 1	Defining the field of Human geography; development of human geography in Anglo American countries and India. Concept of social space, social group, social structure, social differentiation, social diversity, plurality, socio-spatial inequalities, social well-being. (6 lectures) Defining the field of cultural geography; its trend of development and significance. Sauer's Morphology of Landscape School. Themes and concepts in cultural geography: cultural hearth, cultural area, cultural region, cultural landscape, cultural history, cultural ecology, cultural diffusion and cultural integration. Patterns of world cultural regions with reference to (a) language, (b) religion and (c) ethnicity
UNIT 2	Demographic and socio-economic characteristics of India's population: vital rates, population growth, population projections, age-sex composition, literacy and education, social composition and occupational structure; socio-economic well-being of population and population regions.
UNIT 3	Population growth and associated problems in demographic, social and economic fronts, population growth and food problems with special reference to North East India. Population pressure and growing environmental, housing and unemployment problems.
UNIT 4	Inequalities of rural development in India: Concept of inequality, patterns, causes and consequences of inequality, Inequality in rural development in N.E. India, Strategies for balanced rural development in India- Concept and balanced development; inter sectoral relation in rural development

Suggestive Readings:

1. Alam, S. M. et al., 1982: Settlement Systems of India, Oxford and IBH Publishing Co., New Delhi.
2. Bhat, L. S., 1976: Micro-Level Planning: A Case Study of Karnal Area, Haryana, Concept Publishing Co., New Delhi.
3. Blaikie, P. M., 1971: Spatial Organisation of Agriculture in North Indian Village, Trans. Inst. British Geographer, Vol. 50.
4. Chisholm, M., 1966: Geography of Economics, Bell, London. Chisholm, M., 1967: Rural Settlements and Land Use, John Wiley, New York.
5. Chorley, R. J. and Hagget, P., 1967: Models in Geography, Methuen, London.
6. Christaller, W.: The Central Places in Southern Germany, Translated by C.W. Baskin, Prentice Hall, Englewood Chiffs, N. J.
7. Friedmann, J. and Alonso, W., 1969: Regional Development and Planning- A Reader, M.I.T. Press, Cambridge, Mass.
8. Ginsburg, Norton, (ed), 1960: Geography and Economic Development, Research Paper Vol. 62, University of Chicago Press, Chicago.
9. Graham, E.R., 1944: Natural Principles of Landuse, Oxford University press, New York.
10. Gosal, G. S. and Krishan, G., 1984: Regional Disparities in Levels of Socio-economic Development in Punjab, Vishal Publications, Kurukshetra. 83
11. Hirschman, A., 1958: The Strategy of Economic Development, University Press, Yale, New Haven.
12. Kundu, A. and Raza, M., 1982: Indian Economy: The Regional Dimension, Center for the Study of Regional Development, Jawararlal Nehru University, New Delhi. McRae, S. G. et al., 1981: Land Evaluation, Oxford Clarendon Press, Oxford.
13. Misra, R. P. et al.: Rural Area Development Perspectives and Approaches, Starling, New Delhi.
14. Misra, R. P., 1985: Rural Development: Capitalist and Socialist Patterns, 5 Volumes, Concept Publishing Co., New Delhi.
15. Misra, G. K. et al., 1980: Regional Planning at the Micro-Level: A Case Study for Electrification in Bastar, IIPA, New Delhi.
16. Myrdal, G., 1957: Economic Theory and Under-Development Regions, Gerald Duckworth, London.
17. Ramachandran, H., 1980: Village Clusters and Rural Development, Concept Publishing Co. New Delhi.
18. Richardson, H. W., 1969: Regional economics, Weidenfeld and Nicolson, London
19. Sen, Lalit K., (ed), 1972: Readings in Micro-level Planning and Rural Growth Centers, N.I.C.D., Hyderabad.
20. Singh, J., 1974: An Agricultural Atlas of India- A Geographical Analysis, Vishal Publications, Kurukshetra.
21. Steward, G.S., 1968: Land Evaluation, MacMillan of Australia. Tarrant, J. R., 1974: Agricultural Geography, Newton Abbot, David and Charles.
22. Wanmali, S., 1983: Service Centers in Rural India, B.R. Publishing Corporation, Delhi.
23. Snallenbrock, A. J. H. and Spit, T. J. M., 1992: Regions and Regionalization in the Netherlands, Tijdschrift Voor, Econ. En. Soc. Geografie. 82 (3).

Dean Faculty of Environmental Science, RGU

GEO-CC-4740: RESEARCH TRENDS IN REGIONAL PLANNING

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Understand the concepts, identification, and management of different types of regions for sustainable development.
2. Analyze key theories, methods, and techniques of regional planning and their applications in spatial distribution and development.

Learning Outcomes

1. Students will be able to apply regionalization methods and planning techniques to identify, analyze, and manage resource and functional regions.
2. Students will develop the ability to use development indicators and spatial models for informed decision-making in regional and town planning contexts.

UNIT	COURSE CONTENT
UNIT 1	**The Concept of region and regional development Identification of regions:** 1. Resource regions 2. Functional Regions 3. Problem Regions Conservation and management of resources for regional development
UNIT 2	**Approaches to regional planning: Synoptic, functional and ad-hoc or specific (8 lectures) 5 Theories of spatial distribution:** 1 Central place theory of Christaller 2 Growth Pole theory of Perroux and Boudeville 3 Core-periphery theory of Frederick 4 Cumulative causation theory of Gunnar Myrdal 5 Multi-level Growth Foci concept of R. P. Misra.
UNIT 3	Methods of regionalization and techniques of regional planning. Decentralization and multi-level planning. Town and Country Planning Development indicators: Per capita income, energy consumption, resource and infrastructure base, and demographic indicators.
UNIT 4	**Regionalization using methods of:** 1 Overlapping of different themes 2 Ranking using mean and standard deviation. 3 Factor analysis. **Delimiting influence areas of nodal centers using:** 1 Breaking point method 2 Gravity potential method and potential surface mapping. Application of input-output analysis for prediction of short-range change in regional development.

Suggestive Readings:

1. Banerjee, A. and Kar. B., 1999: Economic Planning and development of North Eastern States, Kanishka Publications, New Delhi.
2. Choud, M. and Puri, V. K., 1983: Regional Planning in India, Allied Publications, New Delhi.

3. Deb, B. J., 1995: Regional Development in North East India, Reliance Publications, New Delhi.
4. Friedman, J. and William Alonso (eds), 1964: Regional Development and Planning, Cambridge, Mass. M.I.T. Press.
5. Friedman, J., 1973: Utilization, Planning and National Development, Bererly Hills, Sage Publications.
6. Gallion, A. B. and Simon Eisner, 1974: The Urban Pattern: City Planning and Design, East West Press Pvt. Ltd., New Delhi and Van Norstrand Reinhold Co.
7. Glasson, J., 1974: An Introduction to Regional Planning, Hutchinson Educational Ltd., London. Gogoi, J. K., 1978: The Government of India's Policy for Regional Development- A Summing Up and a Critique, North Eastern Econ. Rev. II (3), July-Sept.
8. Goswami, A., 1981: Assam's Industrial Development: Urgency of New Direction, Econ. Pol. Weekly, XVI (21) Hilhorst, J.G.M. and Dunham, D.M., 1971: Issues in Regional Planning, Institute of Social Studies, The Hague.
9. Holier, G. P., 1988: Regional Development, in Michael Pacione (ed.), The Geography of the Third World: Progress and Prospect, Rutledge, London and New York.
10. Isard, Walter et al, 1998: Methods of Interregional and Regional Analysis, Ashgate Publishing Ltd., Aldershot.
11. Kidwai, A. H., 1985: Disparities in the Levels of Regional Development and Spatial Differentiation in India in the Historic Context, CSRD, JNU, Mimeo.
12. Mishra, R. P., Sundaram, K.V. and Rao, P., V.L.S., 1974: Regional Development Planning in India; A New Strategy, Vikas Publications, New Delhi.
13. Mishra, R.P., 1992: Regional Planning; Concept, Techniques, Policies and Case Studies, Concept Publications, New Delhi.
14. Mohapatra, A.C., 1985: The Concept of region, Hill Geographer, IV (1) Mohapatra, A.C. and Rootray, J.K., 1998: Regional Development and Planning, Rawat, Jaipur.
15. Mukherjee, A., 1991: Methodology and Database for Decentralized Planning, Heritage, New Delhi.
16. Mukherjee, A., 1993: A Perspective Plan for A Hill District, Heritage, New Delhi.
17. Pannerselvam, A., 1999: Regional Development in the Developing Countries: A Search for Appropriate Theory, Space, 12 (2).
18. Ridell, R., 1985: Regional Development Policy, St. Martin's Press, New York.
19. Sandesara, J.C., 1992: Industrial Policy and Planning, 1947-91: Tendencies, Interpretations and Issues, Sage Publications, New Delhi.
20. Sanyal, B. M., 2001: India: Decentralized Planning, Concept, New Delhi. Smith, B.C., 1965: Regionalism, Action Society Trust, London.

GEO-MC-4710: RESEARCH METHODOLOGY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Equip students with foundational **quantitative and statistical techniques** for geographical data collection and analysis.
2. Develop practical skills in **computer applications and spatial analysis tools** (Excel, SPSS, ARCGIS, QGIS) relevant to geography research.

Learning Outcomes

1. Students will be able to **conduct statistical analyses and spatial data processing** using appropriate software tools.
2. Students will gain experience in **fieldwork methods, questionnaire design, and research presentation**, enhancing their applied research capabilities.

UNIT	COURSE CONTENT
UNIT 1	Quantitative Techniques: Sampling and Data Collection, Descriptive Statistics / Inferential statistics (Correlation)
UNIT 2	Computer Application: Excel data analysis, SPSS, Spatial Analysis (ARCGIS, QGIS)
UNIT 3	Review of Published Research: Physical Geography, Human Geography, Regional Planning - Biogeography
UNIT 4	Training and Field Work: Interaction on preparation of questionnaires and schedule, Pilot study on the proposed theme, Seminar, Presentation and Discussion

Suggestive Readings:

1 Corey, Stephen M. : Action Research to improve School Practice, New York, Bureau of Publication, Columbia University.

2 Beard, R. Bligh D. Harding, A (1978) Research into Teaching Methods in Higher

3 Education, Guildford : Society for Research into higher Education.

4 Mackenzie, N. Eraut, M, Jones H. (1975) Teaching and Learning: An introduction to New Methods and Resource in Higher education, Paris : UNESCO and International Association of Universities.

5 Siegal, S. (1956) Non-Parametric Statistics for the Behavioral Science, New York: McGraw Hill.

6 Tuckman, B.W. (1978) Conducting Educational Research, New York: Harcount Brace Jovanovich.

SEMESTER VIII

SEMESTER VIII

GEO-CC-4810 RESEARCH PUBLICATION AND ETHICS

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce students to the fundamentals of philosophy and ethics, focusing on moral philosophy and ethical decision-making.
2. Educate students about scientific integrity, research ethics, and publication standards, including misconduct and best practices.

Learning Outcomes

1. Students will understand the principles of ethical conduct in science and research, including avoidance of misconduct like falsification and plagiarism.
2. Students will be able to recognize and address publication ethics issues, including conflicts of interest and identifying predatory journals.

UNIT	COURSE CONTENT
UNIT 1	**Philosophy and Ethics** Introduction to philosophy: Definition, nature and scope, concept branches: Ethics: Definition, moral philosophy, nature of moral judgements and reactions.
UNIT 2	**Scientific Conduct** Ethics with respect to Science and Research, Intellectual honesty and Research integrity; Scientific misconducts Falsification, Fabrication and Plagiarism (FFP), Redundant publications: duplicate and overlapping publications, salami slicing; Selective reporting and misrepresentation of data.
UNIT 3	**Publication Ethics** Publication ethics: definition, introduction and importance; Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.;
UNIT 4	**Conflicts of interest, publication misconduct:** Definition, concept, problems that lead to unethical behaviour and vice-versa, types; Violation of Identification of Publication misconduct, complaints and appeals; predatory Publishers and journals.

Suggestive Readings:

1. Bird, A. (2006) Philosophy of Science Routledge Macintrye, Alasdair (1967) A sport Histroy of Ethics London
2. P. Chaddah, (2018) Ethics in Competitive Research: do not get scooped; do not get plagiarized, ISBN: 9789387480865
3. National Academy of Sciences, National Academy of Engineering and Institute of Medicine (2009). On being a Scientist: A Guide to Responsible conduct in Research third Edition, National Academies Press.
4. Resnik, d. B. (2011) what is Ethics in research & why is it important. National institute of

Environmental Health Sciences, 1-10. Retrieved from https://wwwniehs.nih.gov/research/resources/bioethics/whatis/index.cfm

5. Geall, J. (2012) Predatory publishers are corrupting open access. Nature, 489 (7415), 179-179 https:??doi.org/10.1038/489179a
6. Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019), ISBN: 978-81-939482-1-7
7. http>://www.insaindia.res.in/pdf/Ethics Book. Pdf.

GEO-DE-4810: HYDROLOGY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objective:

1. To understand the basic concept of hydrology and its relationship with other allied science
2. To understand role of hydrology in addressing the issues on water scarcity

Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand and appreciate the nature of hydrology and its importance in the day to day activities
2. Solve many of the water issues in the light of water conservation strategies.

UNIT	COURSE CONTENT
UNIT 1	Concepts and scope of hydrology, Hydrological cycle, Hydrology in relation to water resources development
UNIT 2	Surface water hydrology: Hydrological cycle in drainage basin, Runoff and Basin Yield, Surface water resources of India
UNIT 3	Ground water hydrology: Lithology and its hydrological properties, Type of aquifers, Recharge and discharge of groundwater, Ground water resources of India
UNIT 4	Problems and Conservation of Water Resources: Conjunctive use of ground water, Impact of climate change on water resources, Water stressed areas, Water Conservation strategies – traditional and modern

Suggested Readings:

1. Addison, H. Land Water and Flood, Chapman and Hall, London 1961.
2. Chorley, R.J. (ed) : Introduction to Physical Hydrology, Methuen, London.1969 Chorley,R.J.: Water, Earth and Man,methuen,London,1967.
3. Dakshinamurthy, C .et al., Water Resources of India and Their utilisation in Agriculture, Indian Agriculture Research Institute, New Delhi,1973.
4. Jones, J.A.A : Global Hydrology: Processes, Resources and Environmental Management, Longman,London,1997

5. Matter, J.R., Water Resources. Distribution, Use and Management, John Wiley, Marylane, 1984.
6. Singh, R.A. and Singh, S.R.: Water Management: Principles and Practices. Tara Publication, Varanasi, 1972.
7. Todd, D.K.: Ground Water Hydrology, John Wiley, New York, 1959.

GEO-DE-4820: SOIL GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objective:

1. To understand the basic concept of soil and its relationship with other allied science
2. To understand soil classification, erosion and its conservation strategies

Learning Outcome:
After the completion of course, the students will have ability to:

1. Understand and appreciate the nature of soil, its physical and chemical composition
2. Understand different ways of soil erosion and its conservation strategies.

UNIT	COURSE CONTENT
UNIT 1	Nature, Scope and Relationship with other Sciences, Factors and Processes of Soil formation
UNIT 2	Physical Composition: Structure, Texture, Colour and Pore space, Chemical Composition: pH, Organic matter and Clay minerals
UNIT 3	USDA Soil Classification, Land Capability / Suitability classification: FAO and
UNIT 4	Soil Erosion: Processes, mechanism and types, Soil Conservation: Methods and Techniques

Suggested Readings:

1. Backman, H.O and Brady, N.C. 1960: The Nature and Properties of Soils, Mc Millan New York,
2. Bennet, Hugh H.: Soil Conservation, McGraw Hill, New York.
3. Bunting, B.T. 1973: The Geography of Soils, Hutchinson, London,
4. Clarke G.R. 1957: Study of the Soil in the Field, Oxford University Press, Oxford,
5. Foth H.D. and Turk, L.M 1972.: Fundamentals of Soil science, John Wiley, New York,
6. Govinda Rajan, S.V. and Gopala Rao, H.G. 1978: Studies on Soils of India Vikas, New Delhi,
7. Mc. Bride, M.B. 1999: Environmental Chemistry of Soils, Oxford University Press, New York.
8. Nye, P.H. and Greene, D.J. 1960: The Soil under Shifting Cultivation Commonwealth Bureau of Soil Science, Technical Communication, No. 51; Harpender, England.
9. Raychoudhuri, S.P. 1958: Soils of India, ICAR, New Delhi,
10. Russell, Sir Edward J. 1961: Soil Conditions and Plant Growth, Wiley, New York,

GEO-DE-4830: SOIL AND HYDROLOGICAL ANALYSIS

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Develop skills in physical and chemical analysis of soil, including sampling, texture, moisture, pH, and organic content.
2. Equip students with knowledge to analyze and model drainage basins and hydrological data, including discharge and return period calculations.

Learning Outcomes

1. Students will be able to conduct soil sampling and perform physical-chemical soil analyses for environmental and geographical studies.
2. Students will demonstrate proficiency in interpreting drainage basin characteristics and hydrological flow data using graphical and statistical methods.

UNIT	COURSE CONTENT
UNIT 1	Physical analysis of Soil: sampling, soil texture, moisture
UNIT 2	Chemical analysis of soil: pH, organic content, clay content, spatial modelling
UNIT 3	Deliniation of drainage basin, drainage density and frequency, Sinousity index (TSI, HSI)
UNIT 4	Represenatation of discharge data: hydrograph, Analysis of stage and discharge, determination of return period

Suggestive Readings:

1. Boulding, J. R., & Ginn, J. S. (2016). Practical handbook of soil, vadose zone, and ground-water contamination: assessment, prevention, and remediation. CRC Press.
2. Florinsky, I. (2016). Digital terrain analysis in soil science and geology. Academic Press.
3. Gregory, K. (1980). Updating geomorphology: Practical Fieldwork in Hydrology If It Moves, Measure It!. Teaching Geography, 5(4), 170-174.
4. Handbook of Applied Hydrology: McGraw-Hill, New York, 4-39.
5. Lindsay, J. B. (2005). The terrain analysis system: A tool for hydro-geomorphic applications. Hydrological Processes: An International Journal, 19(5), 1123-1130.
6. Nag, P., & Saha, G.N. (1996). Geomorphological Mapping: Perspectives & dimensions (Vol 13).
7. National Atlas and Thematic Mapping Organisation, Department of Science and Technology, Govt. of India.
8. Strahler, A. N. (1964). Part II. Quantitative geomorphology of drainage basins and channel networks.

GEO-DE-4840: PHYTHOGEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce the fundamental concepts of ecology and ecosystem dynamics, focusing on plant colonization, speciation, and extinction.
2. Develop understanding of environmental factors affecting plant growth and distribution and principles of conservation biology.

Learning Outcomes

1. Students will be able to analyze ecological processes and factors influencing plant distribution, including biotic and abiotic interactions.
2. Students will demonstrate skills in species distribution modeling and conservation assessment, using tools like habitat suitability and bioclimatic models.

UNIT	COURSE CONTENT
UNIT 1	Meaning, scope and development, concept of Ecology and Ecosystem, Plant colonisation and dispersal, Plant speciation and extinction
UNIT 2	Determinants of plant growth and distribution: Topographic Factors (Slope, Aspect, Altitude), Climatic factors (Light, temperature, precipitation), Edaphic Factors (Soil pH, moisture and texture) and Biotic factor (interactions between plants and animals)
UNIT 3	Conservation status, diversity indices and patterns, Eco-regions, endemism, threatened species, Conservation units
UNIT 4	Types of species distribution modelling, Presence -only data vs presence-absence data, Bioclimatic modelling, Habitat suitability analysis

Suggested Readings:

1. Abdurakhmanov, G. M., Myalo, E. G., Ogureeva, G. N. (2014). Biogeography. Textbook for students. Moscow, Academy. pp. 448.
2. Brown, J. H. and Gibson, A.C. (1983). Biogeography. St. Louis: Mosby.
3. Myers, A. A. and Giller, P. S. (1989). Analytical Biogeography: An Integrated Approach to the Study of Animal and Plant Distributions. London: Chapman and Hall.
4. Cox, C. B., Ladle, R. and Moorem, P. D. (2016). Biogeography: An Ecological and Evolutionary Approach. John Wiley & Sons.
5. Gavin, D. G. (2012). Biogeography. in J. P. Stoltman, eds. 21st Century Geography: A Reference Handbook. SAGE Publications, Thousand Oaks, CA. Pages 77-89.
6. Lomolino, M. V., Riddle, B. R., Brown, J. H. and Whittaker, R. J. (2010). Biogeography. Fourth Edition. Sinauer Associates, Sunderland, MA.
7. McCarthy, D. (2011). Here Be Dragons: How the study of animal and plant distributions revolutionized our views of life and Earth. OUP Oxford.
8. Molles, M. C. (1999). Ecology: Concepts and Applications. WCB/McGraw-Hill.

9. Pielou, E. C. (1974). Population and Community Ecology: Principles and Methods. Gordon and Breach.
10. Kumaresan, V. and Arumugam, N. (2016). Plant Ecology and Phytogeography. Sara Publication, Nagercoil, Tamil Nadu.
11. Franklin Janet (2009). Mapping Species Distributions: Spatial inference and prediction. Cambridge University Press, United Kingdom.

GEO-DE-4850: ZOOGEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce core ecological concepts related to animal species distribution and dispersal, and ecosystem development.
2. Explore environmental and biotic factors influencing animal growth and distribution and principles of conservation planning.

Learning Outcomes

1. Students will be able to explain determinants of animal distribution and assess conservation status using diversity indices and eco-regional patterns.
2. Students will develop skills in species distribution modelling and habitat suitability analysis using presence-only and presence-absence data.

UNIT	COURSE CONTENT
UNIT 1	Meaning, scope and development, Concept of Ecology and Ecosystem, species distribution and dispersal
UNIT 2	Determinants of animal growth and distribution: Climatic factor, Edaphic factors, Biotic factors
UNIT 3	Characterising biotas and conservation planning: Conservation status, diversity indices and patterns, Eco-regions, endemism, threatened species, Global Conservation assessments
UNIT 4	Types of species distribution modelling, presence-presence-only data vs presence-absence data, Bioclimatic modeling, Habitat suitability analysis

Suggested Readings:

1. **The Zoogeography: The Geographical Distribution of Animals** by P.J. Darlington (1957) - A classic comprehensive text on animal distribution patterns and biogeography.iaszoology
2. **A Text-Book of Zoogeography** by Frank Evers Beddard (available in print and PDF) - An authoritative foundational book on zoogeography principles and examples.vliz+3
3. **Animal Geography** by Wilma George (1962) - Covers geographical aspects of animals and their habitats.iaszoology
4. **Dynamic Zoogeography: With Special Reference to Land Animals** by Miklos D. F Udvardy (1969) - Discusses animal biogeography and dynamic changes in distribution.iaszoology
5. **Zoogeography of India and South East Asia** by S.K. Tiwari - Regional focus on zoogeography of Indian fauna with conservation context.iaszoology
6. **Species Distribution Modeling for Conservation Educators and Practitioners** by RG Pearson - A practical guide on species distribution modeling methods including presence-only and presence-absence data and conservation applications.amnh+1
7. **Conservation Biology for All** edited by Sodhi and Ehrlich - Covers principles and practices of conservation planning and biodiversity management relevant to zoogeography.conbio

8. **Foundations for Advancing Animal Ecology** (Hopkins Press, 2020) - Discusses modern approaches to habitat and population management in animal ecology.press.jhu
9. **Introduction to Zoogeography** by Joachim Illies (1974) - A concise introduction to the scope and methodologies of zoogeography.iaszoology
10. **Aspects of Zoogeography** by Paul Muller (1974) - Explores various thematic areas in animal geographical distribution.iaszoology

GEO-DE-4860: PLANT AND ANIMAL SURVEY TECHNIQUES

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Equip students with practical skills in plant and animal survey techniques, including quadrate, transect, point count, and call count methods.
2. Develop competence in species distribution modelling, habitat suitability analysis, and essential field research methodologies.

Learning Outcomes

1. Students will be able to conduct ecological surveys and apply statistical and spatial models (MAXENT, AHP) for species distribution and habitat analysis.
2. Students will gain experience in designing, executing, and reporting field research projects, including data collection, analysis, and interpretation.

UNIT	COURSE CONTENT
UNIT 1	**Plant survey techniques** 1. Quadrate 2. Transect 3. Soil Analysis **Animal Survey techniques** 1. Transect 2. Point Count 3. Call Count
UNIT 2	1. Species Distribution Models 2. Maximum Entropy (MAXENT) 3. Habitat Suitability Analysis: Analytic Hierarchical Process
UNIT 3	1. Significance of field work in Geography 2. Identification of Research Problem 3. Sources of data and sampling 4. Data analysis
UNIT 4	Field visit and Project Report The project report is based on supervised field work for appropriate duration, which will be conducted in appropriate place. The Teacher in-charge is to select a suitable study area in advance and conduct the survey for the collection of primary / secondary data.

Suggested Readings:

1. Abdurakhmanov, G. M., Myalo, E. G., Ogureeva, G. N. (2014). Biogeography. Textbook for students. Moscow, Academy. pp. 448.
2. Brown, J. H. and Gibson, A.C. (1983). Biogeography. St. Louis: Mosby.
3. Myers, A. A. and Giller, P. S. (1989). Analytical Biogeography: An Integrated Approach to the Study of Animal and Plant Distributions. London: Chapman and Hall.
4. Cox, C. B., Ladle, R. and Moorem, P. D. (2016). Biogeography: An Ecological and Evolutionary Approach. John Wiley & Sons.

5. Gavin, D. G. (2012). Biogeography. in J. P. Stoltman, eds. 21st Century Geography: A Reference Handbook. SAGE Publications, Thousand Oaks, CA. Pages 77-89.
6. Lomolino, M. V., Riddle, B. R., Brown, J. H. and Whittaker, R. J. (2010). Biogeography. Fourth Edition. Sinauer Associates, Sunderland, MA.
7. McCarthy, D. (2011). Here Be Dragons: How the study of animal and plant distributions revolutionized our views of life and Earth. OUP Oxford.
8. Molles, M. C. (1999). Ecology: Concepts and Applications. WCB/McGraw-Hill.
9. Pielou, E. C. (1974). Population and Community Ecology: Principles and Methods. Gordon and Breach.
10. Kumaresan, V. and Arumugam, N. (2016). Plant Ecology and Phytogeography. Sara Publication, Nagercoil, Tamil Nadu.
11. Franklin Janet (2009). Mapping Species Distributions: Spatial inference and prediction. Cambridge University Press, United Kingdom.

GEO-DE-4870: GENDER GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objective:

1. To enable students to understand the relevance of and developments in the subfield of geography of gender in general and India.
2. To equip students with an understanding of regional variations in construction of gender through the frame of genders capes.

Learning Outcome:
After the completion of course, the students will have ability to:

1. The content of the course will help in understanding the emergence of the subfield of geography of gender as well its trajectory of growth in the world and India.
2. Understanding gendered implications of public and private spaces and spatial variations in construction of gender in the world an Indian context

UNIT	COURSE CONTENT
UNIT 1	Conceptualizing Gender within Geography Social construction of the feminine and masculine, Development of and theoretical approaches to the study of Gender in geography; Examining Gender in relation to space: Division of space in to private and public spaces, Gendered environments, gendered access to and experience of space; spatial variations in the construction of gender
UNIT 2	Spatial Patterns and modes of Gender discrimination and inequalities Patriarchy, Matriarchy, Matriliny and Matrilocality, Gender and social values; Social space and gender, creation of gendered space and reproduction of gendered space
UNIT 3	Gender identity, gender relationships, strategic and practical domains Gender Policy and practice in India; Problems of empowerment of women in India Gender and development
UNIT 4	Gender disparities in education and health Global pattern and the Indian situation; Women in occupations and employment, social assignments of work and work preferences Crime against women (home and work environment), gender stereotypes and representation in media

Suggested Readings:

1. Women and Geography Study Group. (1984). Geography and gender: an introduction to feminist geography. London: Hutchinson Education
2. Gillian, Rose. (1993). Feminism and Geography: the limits of geographical knowledge. Minnesota: University of Minnesota Press
3. McDowell, Linda. (1999). Gender, identity and place: Understanding feminist geographies. Minnesota: University of Minnesota Press
4. McDowell, Linda. (1992). "Doing gender: feminism, feminists and research methods in human geography." Transactions of the institute of British Geographers: 399-416.
5. Raju, Saraswati. (2011). Gendered Geographies: Space and Place in the South Asia, (ed.). New Delhi: Oxford University Press.
6. Raju, Saraswati, and Kuntala Lahiri-Dutt. (2011). Doing gender, doing geography: emerging research in India, (ed.). London: Routledge
7. Agarwal, Bina. (1994). A field of one's own: Gender and land rights in South Asia. Vol. 58. Cambridge: Cambridge University Press
8. Ghadially, Rehana, (2007). Urban women in contemporary India: a reader,(ed.) .New Delhi: Sage Publications.
9. Mies, Maria. (1998). Patriarchy and accumulation on a world scale: Women in the international division of labour. New York: Palgrave Macmillan.
10. Nongbri, Tiplut. (2003). Development, ethnicity and gender: select essays on tribes in India. Jaipur: Rawat Publications

GEO-DE-4880: GEOGRAPHY OF HEALTH

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce core concepts of **medical geography**, emphasizing the impact of climate, topography, and geography on health and disease distribution.
2. Analyze **health care delivery systems, health inequalities, and socio-economic drivers** influencing health outcomes in India.

Learning Outcomes

1. Students will be able to **explain spatial patterns of major diseases and health disparities**, including epidemic and pandemic trends like COVID-19.
2. Students will develop skills in **measuring health indicators and applying GIS and geo-statistical methods** for health mapping and analysis.

UNIT	COURSE CONTENT
UNIT 1	Definition and concept of Medical Geography, Climate and Health (micro climatic realities, development and health) Topography and Health Geographical distribution of major diseases in India (communicable and non-communicable) Epidemics and Pandemics with special reference to COVID-19
UNIT 2	Health Care Delivery Systems: Impact of Geographical factors in Health Delivery Systems, Structure of health care services in India, Health inequality Problem of access and utilization Investment in Health Public and Private Initiatives in health-care provisions Health Policy in Pre-independence & Post Independence India
UNIT 3	**Drivers of Health Disorders** Poverty, Hunger, Food Insecurity Population: Crowding, Congestion, Age and Sex Structure; Literacy and educational levels; Social and Economic Security; Hygiene; Basic Facilities and Amenities.
UNIT 4	**Measurement of Health and Health Disorders** Poverty and Hunger; Hunger Index, SNU and ICMR scale of nutrition, Morbidity, Mortality, BMI, WBI, HDI; Health GIS; Disease Mapping; Geo-statistical methods of Health issues.

Suggested Readings:

1 Bonita, R., Beaglehole, R., Kjellstrom, T. (2006) Basic epidemiology *(link is external), 2nd Ed. World Health Organization (WHO), Geneva, Switzerland. Pp 219*

2 *Choudhary, B.K., Tuberculosis in India: A Political Ecology Approach, VDM Verlag, 2008*

3 *Clark, M., Riben, P. & Nowgesic, E., The association of housing density, isolation and tuberculosis in Canadian First Nations communities, International journal of epidemiology, vol. 31, no. 5, pp. 940-936. 2002*

4 *Cohen, M.L., Changing patterns of infectious disease, Nature, vol. 406, no. 6797, pp. 762-767. 2000*

5 *Cromley, E.K. & McLafferty, S.L. (2012)* GIS and Public health. *2nd Edition. Guilford Press. New York. pp 503. ISBN 978-1-60918-750-7. Available from the vendor of your choice or from Amazon.com -* GIS and Public Health*(link is external)*. *(This textbook will also be readily available through the Penn State Libraries E-Book program at no cost to the student. Students do not need to purchase a physical copy of the book.)*

6 *Elliott, P., Wakefield, J., Best, N., and D. Briggs, Spatial Epidemiology: Methods and Applications, Oxford University Press, 2000*

7 *Eyles, J. & Litva, A., Coming out: exposing theory in medical geography, Health and Place, vol. 1, pp. 5–14. 1993*

8 *Farmer, Paul. Infections and Inequalities: the Modern Plagues. Berkeley: University of California Press. 1999*

9 *Kalipeni, E., Craddock, S., Oppong, J.R., Ghosh, J., ed), HIV and AIDS in Africa: Beyond Epideminology, Blackwell Publishing Ltd, Oxford, 2004.*

GEO-DE-4890: URBAN GEOGRAPHY

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce key concepts and approaches in **urban studies and urban environment**, including smart cities and urban governance.
2. Examine emerging **urbanization trends, environmental challenges, and planning techniques** for sustainable urban development.

Learning Outcomes

1. Students will be able to **analyze urbanization patterns, urban environmental issues, and governance frameworks** in India.
2. Students will develop skills in **urban research methods, remote sensing, GIS applications, and socio-economic surveys** for urban planning and management.

UNIT	COURSE CONTENT
UNIT 1	**Basic Concept and Approaches** 1 Concept of Urban Area, 2 Urban Environment and Smart City; 3 Approaches of Urban Studies; 4 Approaches to the study of Urban Environment.
UNIT 2	**Emerging Issues and Research Trends** 1 Trends and Patterns of Urbanization in India: Post Independence Period; 2 Functional Classification of Towns; 3 Urban Problems and Environmental Degradation in India; Micro Climate of Cities; 4 Urban Pollution (Air, Water and Noise) and Health Impacts; Urban Social Space and Urban crime.
UNIT 3	**Urban and Environmental Planning** 1 Techniques of Town Planning: Delhi or Chandigarh; 2 Urban Transport Planning; Basis of EIA; 3 Concept of Urban Sustainability and Urban Environmental Conservation Strategies: International and National Conventions; 4 Urban Governance Programmes in India; Implications of 74th CAA on urban governance; Future governance structure PPP.
UNIT 4	**Research Methodology** 1 Models for Internal Structure, Hierarchy and Spacing of Cities; 2 Urban Sprawl; Urban Poverty and Slums; 3 Use of Remote Sensing Data for Urban Land uses and Change Detection; GPS and GIS for Urban Mapping; 4 Socio-economic and Environmental Surveys for Urban Themes.

Suggested Readings:

1. Dutt, Ashok et. al. 1994. The Asian Cities: Processes of Development, Characteristics and Planning. GeoJournal Library, London.
2. Fyfe, Nicholas R. and Kenny, Judith T. (eds.) 2005. *The Urban Geography Reader*. Routledge, London.
3. Gallien, A. B. and S. Eisner 1963. Urban Pattern, New York.

4. HUDCO-HSMI. 2001. The States of Indian Cities, HUDCO HSMI, New Delhi.
5. Jha, R. and Nasreen Siddiqui 2000. Towards People Friendly Cities, UNICEF Maharashtra State Office, Mumbai.
6. Knox, Paul and Pinch, Steven 2006. *Urban Social Geography*. Pearson Prentice-Hall, Englewood Cliffs NJ. 5th Ed.
7. Kumar, B. and R. B. Singh 2003. Urban Development and Anthropogenic Climatic Change. Manak Publications, New Delhi.
8. Kundu, A. 2005. Urban Development and Urban Research in India, Khama Publishers, New Delhi.
9. Mathur, M. P. 2007. Norms and Standards of Municipal Basic Services in India, National Institute of Urban Affairs, New Delhi available on www.niua.org accessed on 1st June 2010.
10. Pacione, Michael 2005. *Urban Geography: A Global Perspective*. 2nd ed. Routledge, London.
11. Prakasa Rao, V. L. S. 1983. Urbanisation in India: Spatial Dimensions, Concept, New Delhi.
12. Misra. R.P. and Misra, K. (eds.) 1998. Million Cities of India Vol.I/II Sustainable Foundation, New Delhi. 30
13. Ramachandran, R. 1989. Urbanisation and Urban System in India, Oxford University Press, New Delhi.
14. Singh, R.L. 1955. Bananas: A Study in Urban Geography, Nand Kishor and Brothers, Bananas.
15. Sivaramakrishnan, K. C. et al. 2005. A Hand Book of Urbanisation in India, Oxford University Press, New Delhi.
16. UNCHS-UN HABITAT 2001. Cities in a Globalising World. Global Report on Human Settlement, Earthscan, London and Sterling, VA.
17. UN-HABITAT 2003. Water and Sanitation in World Cities: Local Action for Global Goals, Earthscan London.
18. Vaidya, Chetan 2009. Urban Issues, Reforms and Way Forward in India working paper No. 4/2009-DEA available on www.niua.org accessed on 1st June 2010.

GEO-DE-48100: GEOGRAPHY OF RURAL DEVELOPMENT

Credit 4- (Credit Hours in a week: Lecture-4)
Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objective:

1 The main objectives of this course is to give students an insight into the concepts, approaches and planning process related to rural development in India.
2 The students will earn the rural economic base, rural development process and provision of services in rural areas.

Learning Outcome:

After the completion of course, the students will have ability to:

1 Appreciate the concepts, needs and various approaches to rural development;
2 Understand the strong economic bases of rural areas of India;
3 Appreciate the area based and target group-based approaches and provision of services to rural development.

UNIT	COURSE CONTENT
UNIT 1	Defining Development: Inter-Dependence of Urban and Rural Sectors of the Economy; Need for Rural Development, Gandhian Approach of Rural Development.
UNIT 2	Rural Economic Base: Panchayati Raj System, Agriculture and Allied Sectors, Seasonality and Need for Expanding Non-Farm Activities, Co-operatives, PURA.
UNIT 3	Area Based Approach to Rural Development: Drought Prone Area Programmes, PMGSY.
UNIT 4	Target Group Approach to Rural Development: SJSY, MNREGA, Jan DhanYojana and Rural Connectivity. Provision of Services – Physical and Socio-Economic Access to Elementary Education and Primary Health Care and Micro credit

Suggested Readings:

1 Anand, Subhash.,(2013): *Dynamics of Rural Development*, Research India Press, Delhi
2 Gilg, A. W., (1985): *An Introduction to Rural Geography,* Edwin Arnold, London.
3 Krishnamurthy, J.,(2000): *Rural Development - Problems and Prospects,* RawatPubls., Jaipur
4 Lee, D. A. and Chaudhri, D. P., (eds.)(1983): *Rural Development and State*, Methuen, London.
5 Misra, R. P., and Sundaram, K. V., (eds.)(1979): *Rural Area Development: Perspectivesand Approaches*, Sterling, New Delhi.
6 Misra, R. P., (ed.), (1985): *Rural Development: Capitalist and Socialist Paths*, Vol. 1, Concept, New Delhi.
7 Palione, M., (1984): *Rural Geography*, Harper and Row, London.

8 Ramachandran, H., and Guimaraes, J.P.C., (1991): *Integrated Rural Development inAsia–Leaning fromRecent Experience,* Concept Publishing, New Delhi.
9 Robb, P.,(1983): *Rural South Asia: Linkages, Change and Development*, Curzon Press.
10 Singh, R.B., (1985): Geography of Rural Development, Inter India, New Delhi.
11 UNAPDI (1986):*Local Level Planning and Rural Development: Alternative Strategies*. (United Nations Asian & Pacific Development Institute, Bangkok), Concept Publs. Co., New Delhi.
12 Wanmali, S., (1992): *Rural Infrastructure Settlement Systems and Development of theRegionalEconomy in South India*, International Food Policy Research Institute,Washington, D.C.
13 Yugandhar, B. N. and Mukherjee, Neela., (eds.) (1991): *Studies in Village India: Issuesin Rural Development,* Concept Publications. Co., New Delhi.

GEO-DE-48110: REGIONAL ANALYSIS

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Explore the cultural, social, economic, and political dimensions of cities, including historical evolution and physical structure.
2. Introduce diverse urban planning theories, models, and approaches relevant to Indian and global contexts.

Learning Outcomes

1. Students will be able to analyze urban settlement patterns and interpret cultural and political influences on city development.
2. Students will develop the ability to apply urban planning theories and approaches to critically assess planning processes and strategies.

UNIT	COURSE CONTENT
UNIT 1	City as a cultural construct, ancient to modern- and expression of religion and rituals, social and economic structure, city as a political statement, concept of the "Ideal city" with examples from India and the other parts of the world. Evolution of settlements – origin, influence, livelihood, culture, growth/decline; physical structure – form, organization, space, scale; elements of the city.
UNIT 2	Planning Process Definition and objectives of planning, concepts and approaches, governing factors – vision, strategy, goal, objectives, scope and limitation in the Indian context. Types of plans and planning processes – Structure plans, Action plans, and strategic plans; Autocratic planning, Democratic planning, Technocratic planning, Liberal planning, Socialist planning.
UNIT 3	Planning and development theories – concentric zone theory, sector theory, multiple nuclei theory, land use and land value theory, other latest theories from around the world. Growth Pole theory, Christaller's Central Place theory, Weber's Theory of Locations, Core-periphery theory, Land Use and Land Value Theory of William Alonso, Spread and Back wash theory – relevance of these in the Indian context. Various concepts - Garden city concept, green belt concept, Neighbourhood concept, Generatic and Parasitic city.
UNIT 4	Various models and approaches – Advocacy and Pluralism in planning, Action planning, Mixed planning, Systems approach to planning, Rationalistic and Incremental approach, Mixed Scanning and Middle Range planning, Equity planning.

Suggested Readings:

1 Morris. A.E.J., 1979, History of Urban Form Before the Industrial Revolution, George Godwin Limited, London.

2 Mumford, L., The City in History

3 Gallion. A., Eisner. S., 1998 (fifth edition), The Urban Pattern-City Planning and Design CBS Publishers and Distributors, New Delhi, in arrangement with Van Nostrand Reinhold Company, USA.

4 Le Gates. R. T., Stout. F., (ed), The City Reader, 2011 (fifth edition), Routledge, London.

GEO-MC-4810 RESEARCH PUBLICATION AND ETHICS

Credit 4- (Credit Hours in a week: Lecture-4)

Marks: 100 (End Term Examination = 80 and Internal Examination - 20)

Course Objectives

1. Introduce students to the fundamentals of philosophy and ethics, emphasizing moral philosophy and ethical decision-making.
2. Educate students on ethical principles in scientific research and publication, covering research integrity and misconduct.

Learning Outcomes

1. Students will be able to identify and address ethical issues in research, including falsification, fabrication, and plagiarism.
2. Students will understand publication ethics, conflicts of interest, and how to recognize predatory journals and other misconduct in academic publishing.

UNIT	COURSE CONTENT
UNIT 1	**Philosophy and Ethics** Introduction to philosophy: Definition, nature and scope, concept branches: Ethics: Definition, moral philosophy, nature of moral judgements and reactions.
UNIT 2	**Scientific Conduct** Ethics with respect to Science and Research, Intellectual honesty and Research integrity; Scientific misconducts Falsification, Fabrication and Plagiarism (FFP), Redundant publications: duplicate and overlapping publications, salami slicing; Selective reporting and misrepresentation of data.
UNIT 3	**Publication Ethics** Publication ethics: definition, introduction and importance; Best practices / standards setting initiatives and guidelines: COPE, WAME, etc.
UNIT 4	**Conflicts of interest, publication misconduct:** Definition, concept, problems that lead to unethical behaviour and vice-versa, types; Violation of Identification of Publication misconduct, complaints and appeals; predatory Publishers and journals.

Suggestive Readings:

1. *Bird, A. (2006) Philosophy of Science Routledge*
2. *Macintrye, Alasdair (1967) A sport Histroy of Ethics London*
3. *P. Chaddah, (2018) Ethics in Competitive Research : do not get scooped ; do not get plagiarized, ISBN: 9789387480865*
4. *National Academy of Sciences, National Academy of Engineering and Institute of Medicine (2009). On being a Scientist: A Guide to Responsible conduct in Research third Edition, National Academies Press.*
5. *Resnik, d. B. (2011) what is Ethics in research & why is it important. National institute of Environmental Health Sciences, 1-10. Retrieved from https://wwwniehs.nih.gov/research/resources/bioethics/whatis/index.cfm*
6. *Geall, J. (2012) Predatory publishers are corrupting open access. Nature, 489 (7415), 179-179 https:??doi.org/10.1038/489179a*
7. *Indian National Science Academy (INSA), Ethics in Science Education, Research and Governance (2019), ISBN: 978-81-939482-1-7 http>://www.insaindia.res.in/pdf/Ethics Book. Pdf.*

THANK YOU